

A GUIDE TO CUSTOMIZED LITERACY TRAINING

BOOK 3 Arithmetic

Third edition

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Direction de la formation générale des adultes

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INTRODUCTION

MAIN FEATURES

In this third edition of Book 3, Steps 1 and 2 are similar to those in the second edition. Both steps are still presented in the form of objectives and notes, because there are frequent references to previous notes. In Step 1, the suggested activities are part of the notes. To be consistent with Steps 3 and 4, the codes were changed and the wording of some of the objectives was modified. The prerequisites were retained, but the minimum levels of competency were eliminated.

Steps 3 and 4, however, are presented in a new format. There are two columns under each objective: one for notes and content that are sub-objectives of the stated general objective, and the other for suggested activities. Also, all of the objectives are listed in a separate table so that students can tell at a glance whether they are prerequisites for going on to the next step or for functioning in everyday life, and whether they will be covered in presecondary mathematics. It should be noted that the same objective will be covered differently depending on whether it is addressed in literacy training or in the presecondary orientation.

Likewise, a particular objective may be approached differently depending on the step the students have reached. For instance, in Step 2, the objective “To calculate percentages” involves the use of a calculator only, whereas in Step 4, it also involves mental calculations and more complex situations. The main goal is to enable students to be autonomous as soon as possible by giving them the means of solving problems in the most efficient way possible. They can learn other techniques later on when they are capable of understanding them.

Book 3 is designed with one thing in mind: to help adults learn arithmetic. To familiarize yourself with the underlying orientations of Book 3 and to use this book effectively, it is important to read the introduction to each step and the notes associated with each objective as well as the section entitled “Background,” which outlines the teaching principles for adult learning.

CODES

The codes for all objectives start with the letter A for “arithmetic.” The first digit stands for the learning step and the remainder, for the objective itself.

Example: A 1.01 means: **Arithmetic**
 Step 1
 Objective 1

The content elements under each objective are numbered as follows: C^1 , C^2 , C^3 , etc.

In Appendix 1, the letter P, for “prerequisite,” appears beside objectives students must master before they can go on to the next step. In Steps 3 and 4, the term “prerequisite” may also apply to objectives students must master in order to be autonomous in everyday life.

REVIEW AT THE BEGINNING OF EACH STEP

At the beginning of each step, it is important to make sure that students have attained the objectives of the previous step and assimilated the related content elements, especially those that will not be taken up again.

LIST OF OBJECTIVES

All of the objectives for each of the four steps are listed in an easy-reference table in Appendix 1. It provides an overview of the program at a glance.

The letter P stands for “prerequisite.” It appears beside objectives when the related content will not be reviewed in any systematic way at later steps. This is content students must learn in order to move on to the following step.

Because some objectives are covered in only one of the four steps, they are prerequisites. The students should systematically master these objectives in order to build on them in later steps. The nature and difficulty of the objectives determine the number of steps in which they are studied. It is also important to take into account that some adults will learn faster than others.

While some objectives are not considered prerequisites for autonomy in everyday life, they were included in the program for two reasons: those students who go on to the presecondary level will have had an introduction to some of the concepts they will be learning, and those who do not go on will have acquired useful skills.

FUNCTIONAL TRAINING

Literacy training is of a functional nature (see Note 2 in Book 1). In terms of the training offered by presecondary education services, this approach may be described as follows.

- Learning is determined above all by the functional needs of adult learners rather than by academic requirements.
- Each person learns at his or her own rate rather than at the rate usually imposed at the presecondary level.
- Evaluation of learning is based on specific skills defined in keeping with the students' needs rather than on promotion standards for each subject.
- Transfer of learning is of a horizontal rather than a vertical, sequential nature. In other words, the goal is to have students apply what they learn in their everyday lives rather than at higher levels of difficulty.

PROMOTION TO THE PRESECONDARY LEVEL

The student whose behaviour meets the following criteria may go on to the presecondary level.

• Plans to pursue his or her studies at the presecondary level.	
• HAS ATTAINED <u>all</u> the objectives in Steps 1 and 2: — has acquired the knowledge; — has mastered the skills.	
• Shows autonomy: — works on his or her own; — understands and follows written and oral instructions.	
• Learns at a good rate: — often correctly does his or her work in less time than the others; — did not spend more than two sessions on Step 2.	
• His or her attendance at a course in orientation services confirms his or her eligibility for admission to the presecondary level.	

BACKGROUND

When we talk about teaching arithmetic in a literacy program, we generally think of objectives geared to helping students learn about natural or rational numbers, geometry, measurement and the metric system. Such a program should also, in our minds, place emphasis on techniques such as the algorithms of the four operations or the rule of three, and put students in situations that involve problem solving.

However, we tend to forget about or ignore the learning of concepts despite the fact that arithmetic cannot be learned without an understanding of the mechanisms involved in concept acquisition.

To help students with this aspect of learning:

1. first, start with concrete, familiar situations and role playing;
2. next, use illustrations, ideograms or pictograms;
3. lastly, introduce symbols, i.e. mathematical expressions.

We believe that students must have a firm grasp of basic concepts before they can learn and retain more complex concepts. The best way of acquiring durable technical skills is to understand the reasons for using them. That is why many of the notes that appear under the objectives in this document stress the importance of adopting an active, dynamic teaching approach based on the use of manipulative materials. These notes often include reminders to allow students to apply the knowledge they acquire from everyday situations so that they can gain a solid understanding of basic concepts by referring to their personal experience. This way, it will be easier for them to generalize what they have learned.

Another important point in teaching arithmetic to adult literacy students is to give them the opportunity to immediately apply what they learn to everyday situations. In short, we must help them become competent as soon as possible. Nevertheless, they are confronted daily with calculations that are beyond their skills. For instance, how can they budget over four weeks whatever remains of their monthly cheque after their bills are paid if they have not yet learned division? That is why students are encouraged to use a calculator right from Step 1 of the program. Calculators are widespread in our society and their cost keeps getting lower so that practically everybody can afford one. When introducing students to calculators, it is important to take into account their needs or how they will be using them in their everyday lives (e.g. to add up their purchases, to figure out sales tax).

Problem solving is a third, essential point to work on with students. At each step of the program, the students must be placed in situations that require problem solving. Right from Step 1, it is important to help students develop a problem-solving approach they will be able to use throughout the program. Students must learn to explain how they went about solving a problem and to figure out exactly where they made their mistakes.

The numerous notes are meant to explain as best as possible the various teaching principles which led the authors of this document to divide the objectives of the *Guide to Customized Literacy Training* into four learning steps. While it provides explanations and suggests strategies, this document is not an exhaustive teaching guide. For this reason, it includes a bibliography of useful reference materials.

STEP 1

INTRODUCTION

The main goal of this step is to help adults learn the basic concepts they will need in order to learn arithmetic and geometry. The students will assimilate various concepts related to space and quantity by applying them to situations from their everyday lives. They will learn to recognize the basic geometric shapes in their environment and will learn to use mathematical signs (such as +, - and =) to express the basic concepts they will have acquired.

We will also work on objectives related to numeration. To this end, we have suggested a number of exercises to help students thoroughly understand the values associated with digit places. Here again, the goal is to improve the students' grasp of certain basic concepts, more specifically those related to decimal notation.

Furthermore, we will focus on the objectives related to money. In their daily lives, the students constantly find themselves in situations where they must use money. It is therefore vital that they assimilate the concepts governing our monetary system.

Lastly, since the emphasis is on basic concepts, we will look at the concepts related to the four operations. The goal will be to help the students understand the operations by familiarizing them, through oral exercises, manipulation exercises and role playing, with the common expressions used to describe the four operations. The students will reinforce their understanding of these concepts by applying what they have learned to everyday situations. To this end, they will be shown how to use a calculator since they will not learn the algorithms of the four operations until Step 2.

In Step 1, the students will also be introduced to the problem-solving process. Of course, this will be done in groups and orally. Following a discussion, the students will be asked to think and to determine which operation they should perform to find the solution to a given problem. They will then perform the necessary calculations on a calculator, the idea being that they become competent as soon as possible with the tool most readily understandable to them (the calculator).

OBJECTIVES	NOTES
A 1.01 To acquire certain basic concepts necessary for learning arithmetic: situating themselves in space. A 1.02 To acquire certain basic concepts necessary for learning arithmetic: situating themselves in time. A 1.03 To apply acquired knowledge to everyday objects or situations: situating themselves in space.	1) It is important not to skip over this objective too quickly because the students need to have a good understanding of these concepts. Far from being a waste of time, activities where students manipulate objects, sort them or arrange them in order help them to develop reasoning skills. The idea here is for the students to structure their thinking by learning these concepts and making connections between them. For example, you may ask the students to describe, list, determine, match, sort, compare, define, pick out, or arrange in groups, in order or in sequence. In addition to the above, you may look at time concepts such as yesterday, today, tomorrow, day, week, month, year and season. 2) The students will gain a more stable and solid understanding of a concept if they are actively involved in the learning process. The manipulation and representation activities must be based on a variety of everyday situations.

OBJECTIVES	NOTES
A 1.04 To apply acquired knowledge to everyday objects or situations: situating themselves in time. A 1.05 To acquire certain basic concepts necessary for learning geometry: situating themselves in space. A 1.06 To apply acquired knowledge to everyday objects or situations. A 1.07 To recognize certain geometric shapes.	Suggested activities • Have the students locate objects in the room in relation to each other. • Have them locate themselves in their immediate environment. • Have them describe the similarities and differences between objects, shapes or people. • Have them describe a room in their home and explain how the furniture is arranged. • Have them situate events in time. • See Note 1. • See Note 2. 3) We are referring here to the basic shapes, i.e. the circle, the square, the rectangle and the triangle. The students should learn to recognize these shapes in their environment and not only on paper. For example, the floor is rectangular, the table is square, the roof is pointed like a triangle.

OBJECTIVES	NOTES
A 1.08 To apply acquired knowledge to everyday objects or situations. A 1.09 To acquire certain basic concepts necessary for learning arithmetic (quantity). A 1.10 To apply acquired knowledge to everyday objects or situations.	• See Note 3. 4) Here are a few concepts which could be studied: none, all, some, several, little, a lot, as much as, equal, same, similar, plus, minus, more, less, biggest, smallest. At this point, students are simply asked to associate these concepts with manipulation or observation activities (equal or unequal sets), since they will learn to count when they get to a later objective. Please refer to Note 1 regarding the meaning and importance of this objective. 5) Suggested activities • Have the students compare the number of windows at the front and back of the school (more, fewer, as many as). • Have them draw a picture of their family and compare it with those of their classmates (e.g. none, many, few, several, some).

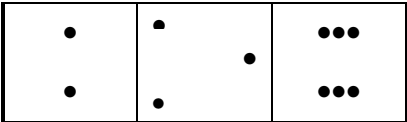
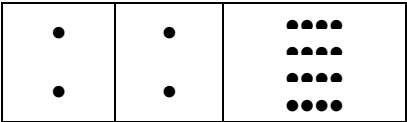
OBJECTIVES	NOTES
A 1.11 To recognize the symbols =, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, \$ and ¢. A 1.12 To use symbols.	6) The idea here is to write mathematical expressions corresponding to the basic concepts studied under the preceding objectives. For example, the equal sign (=) will be used to render the concept “as many as.” Cardinal and ordinal numbers are also introduced. The students should not only learn to recognize the symbols 4 and 5, but also understand that 4 is equal to IIII, and that it comes before 5 IIIII and after 3 III. You may talk about the less than (<) and greater than (>) signs, but they are not prerequisites. 7) Suggested activities to attain this objective and the previous one: • Have the students compare two sets using the <, > or = sign (see Note 6). • Have them identify the \$ and ¢ signs in a catalogue or flyer and notice that a period is used to set off the dollars from the cents. • Have them draw a given number of objects (0 to 9). • Have them write the price of an item using the \$ or ¢ sign or the number with a period. • Have them write down the number of objects in a set.

OBJECTIVES	NOTES
A 1.13 To count using numbers (1 to 99). A 1.14 To form a two-digit number. A 1.15 To break down a two-digit number.	8) A thorough understanding of the values associated with the digit places is essential in order to learn the algorithms of addition and subtraction. This objective is therefore very important in terms of the forming of concepts. To make concept acquisition easier for students, follow the three steps mentioned earlier, under “Background.” 1. First, start with concrete, familiar situations and role playing. 2. Next, use illustrations, ideograms or pictograms. 3. Lastly, introduce symbols, i.e. mathematical expressions. One good way of helping the students understand the decimal system is to have them make groups of objects according to various bases before introducing the decimal base. Egg cartons, cigarette cartons, soft drink cartons and beer cases are only a few of the items you can use. To introduce the decimal base, you could give the students a jar of pennies and ask them to count them. Interrupt them a few times. They will most likely have to start over. You could make them realize that it would be more efficient to count the pennies in groups of ten and discuss the concepts of tens versus ones. To give the students a clear picture of the number in question, show them how they can replace 10 pennies with a dime.

OBJECTIVES	NOTES
A 1.16 To read a number less than 100. A 1.17 To write a number less than 100. A 1.18 To distinguish between odd and even numbers.	For example: 36 pennies = 3 dimes + 6 pennies You could also have them estimate how many pennies there are in a pile. Is it closer to 20 or 30? This estimating activity helps the students understand the concept of number. You could take this activity a step further and have the students break the number down different ways: For example: 36 = 36 ones = 3 tens and 6 ones = 2 tens and 16 ones = 1 ten and 26 ones This would give the students a better idea of the value of the number. They would see the number not only as a series of digits, but also as a representation of a given value. 9) It would be well-advised to break this down into stages. 10) It is important to make the learning of this concept interesting for the students by using a concrete example (e.g. odd and even numbers in addresses).

OBJECTIVES	NOTES
A 1.19 To compare numbers under 100. A 1.20 To rank numbers under 100. A 1.21 To apply acquired knowledge (numbers from 1 to 100) to everyday situations.	11) Suggested activities • Have the students compare two numbers using illustrations. • Have them compare two numbers using the $<$, $>$ and $=$ signs. • Have them write a set of numbers in ascending and descending order. • Have them find the number which comes immediately before or after a given number or between two numbers. 12) The idea here is to give the students an opportunity to apply what they have learned about numbers to everyday situations. Suggested activities • Have the students compare the number of adults enrolled in each of the courses offered at the centre. • Have them identify the largest or smallest class.

OBJECTIVES	NOTES
A 1.22 To form a number of three or more digits. A 1.23 To break down a number of three or more digits.	13) You can do the same exercises as those suggested in Note 8 but with numbers greater than 100. You can also do a great many activities where the students trade objects and find equivalents. Manipulation is very important in helping the students to conceptualize a number, i.e. to have a mental picture of its value. Once they have attained this objective, the students will have no difficulty understanding what is meant by carrying over and borrowing. They will be able to visualize the concrete operation associated with these terms. Have the students use drawings or an abacus, tokens and pieces of cardboard to work with different numbers so that they can see how a number is formed by trading and finding equivalents. Suggested activities • Have the students count 236 tokens. • Have them make: 2 piles of 100 + 3 piles of 10 + 6 tokens and 1 pile of 100 + 13 piles of 10 + 6 tokens. • Have them trade 9 tokens for 23 and determine how many they now have.

OBJECTIVES	NOTES
A 1.24 To read a number greater than 100. A 1.25 To write a number greater than 100. A 1.26 To compare numbers of three or more digits. A 1.27 To rank numbers of three or more digits.	  The <i>Défi mathématique</i> series suggests a number of manipulation exercises designed to help elementary school students learn mathematical concepts. It also suggests logic problems to help students hone their reasoning skills and judgment. See Appendix 2 and the bibliography. • See Note 11. • See Note 11.

OBJECTIVES	NOTES
A 1.28 To apply acquired knowledge (numbers greater than 100) to everyday situations. A 1.29 To distinguish between coins and bills. A 1.30 To establish equivalences between different monetary values. A 1.31 To count sums of money. A 1.32 To read sums of money. A 1.33 To write sums of money.	- See Note 12. The situations must involve larger numbers. For example, have the students study the populations of two cities. 14) The students should be able to recognize the different coins and bills. 15) Start with coins. For example: $4 \times 25\text{¢} = \\$1$; $10 \times 10\text{¢} = \\$1$; $2 \times 5\text{¢} = 10\text{¢}$ Then do the same with paper money. 16) Have the students role play. The cashier must check the amount handed to him or her, and the customer must check the change handed back by the cashier. Even if the students have not yet learned to add or subtract, this kind of activity is appropriate since it is directly related to their everyday lives. The object here is not to add but to <u>count</u> sums of money. This implies that students are able to perform mental calculations in increments of 2, 5, 10, 20, 25 and 50. - See Note 7.

OBJECTIVES	NOTES
A 1.34 To compare sums of money. A 1.35 To rank sums of money. A 1.36 To round off to the nearest dollar.	• See Note 11. 17) With money, it is always recommended that the amount be rounded off to the higher dollar and not to the lower one. If an item costs \$5.45, it is preferable to round the price off to \$6 than to \$5. The purpose of teaching the students to round to the nearest dollar is to enable them to quickly figure out whether they have enough money to pay the bill. For example, if they buy an item that costs \$1.50 and another that costs \$2.99, they can quickly determine that $2 + 3 = 5$. When adding up a longer list of items using a calculator, they will be less likely to make mistakes since they will not have to worry about pressing the decimal key. They will also have a better idea of how much money will be left after paying the bill. For example: I have \$25. The item costs \$4.50, therefore $25 - 5 = 20$. That leaves \$20.

OBJECTIVES	NOTES
A 1.37 To apply acquired knowledge to everyday situations. A 1.38 To write numbers as words. A 1.39 To write cheques. A 1.40 To read receipts. A 1.41 To apply acquired knowledge to everyday situations. A 1.42 To recognize the plus sign.	18) The idea here is to give the students an opportunity to apply what they have learned about money to everyday situations. Suggested activities • Have the students write up a classified ad stating the price they are asking for an object they want to sell. • Have them compare the price of an item in two grocery stores. 19) In the <i>Guide to Customized Literacy Training</i>, this objective is listed as an element of content. It was deemed useful to treat it as a measurable objective. • See Note 19. 20) Ask the students to write a cheque as part of a role-playing activity (e.g. paying the rent, buying an item from a friend). It is important to have them tell you who should write the receipt.

OBJECTIVES	NOTES
A 1.43 To recognize the minus sign. A 1.44 To use the vocabulary associated with addition. A 1.45 To use the vocabulary associated with subtraction.	21) It is recommended that addition and subtraction be dealt with at the same time, by contrasting the two operations. This will help the students understand the operations and see the connection between them. It is important to introduce the words and expressions used in relation to these operations through manipulation, role playing and similar activities. At this stage, focus on the basic vocabulary used in everyday life such as add, more, in all, total, take away, less, left, difference. • See Note 21.

OBJECTIVES	NOTES
A 1.51 To use the vocabulary associated with multiplication. A 1.52 To use the vocabulary associated with division. A 1.53 To multiply and divide using a calculator. A 1.54 To apply a problem-solving approach (reasoning) to everyday situations, using a calculator ($\times$, $\div$).	25) The students must be introduced to the concepts of multiplication and division at the same time so that they can understand the operations and see the connection between them. It is important to introduce the words and expressions used in relation to these operations through manipulation, role playing and similar activities. At this stage, focus on the basic vocabulary used in everyday life such as multiply by, times, how many in all, separate, divide, how many each. • See Note 25. • See Note 23. • See Note 24. Of course, it will be necessary to allow time for the students to familiarize themselves with the $\times$ and $\div$ keys on the calculator before starting on specific problems.

STEP 2

INTRODUCTION

Step 2 will look at some of the basic concepts in greater depth and will familiarize students with the concepts of fraction and percentage, in the latter case, mainly through practical exercises using a calculator. The students will learn the basics of the metric system. They will thereby be able to recognize the various metric units of measurement in their environment and to use certain measuring instruments. However, written equivalences between metric units, such as $3\text{ m} = 300\text{ cm}$ or $3.275\text{ kg} = 3275\text{ g}$, will not be seen in this step. The students should therefore not be expected to attain all of the objectives related to fractions, percentages and metric units: these will be reviewed and further studied at a later stage. Step 2 will end with the algorithms of the four operations (+, -, $\times$, $\div$). In short, the students will learn the rules to be followed in order to master the techniques associated with these algorithms.

It is absolutely necessary to verify whether students starting a literacy program at Step 2 have all the prerequisites. It is also advisable to continue working on numeration with numbers up to 1 000 000 (comparing, breaking down, sorting, value of the digit place).

It should be kept in mind that Notes 21 and 25 of Step 1 also apply to Step 2. Before the students can start studying the algorithms or techniques related to the four operations (+, -, $\times$, $\div$), they must first understand the concept behind each of these operations and have assimilated it through manipulation exercises. They must also be familiar with the principle of equivalences (e.g. 1 ten = 10 ones; 1 hundred = 10 tens). These exercises will help the students understand the techniques to be used. If the students fully understand what they are doing, they will be able to solve a problem more easily. They will not juggle the numbers but will try to understand the problem before them. Above all, it is important that the students ask questions and study the figures instead of trying to find the answer through trial and error using techniques alone. It may happen that the students will master the techniques but not be able to solve a written problem. These adults often apply a technique they have memorized without understanding its purpose and without seeing its connection to other elements, which explains their difficulty with problem solving. Problem solving is considered a prerequisite to the extent that it provides a means of assessing individual students' ability to use the four operations in their everyday lives. The students will, however, continue to learn problem solving in subsequent steps.

OBJECTIVES	NOTES
A 2.01 To acquire certain basic concepts necessary for learning fractions. A 2.02 To apply acquired knowledge to everyday objects or situations. A 2.03 To recognize the percent sign.	26) It is important for students to master fractions at this stage. Manipulation activities will be the main way of helping them do so. It is also advisable to use a wide variety of situations or examples. The students must have as accurate an idea as possible of fractions and of the type of relationship which exists between two quantities in a fraction. The students must, from the start, be made aware of two types of fractions, namely, fractions which represent part of a whole (e.g. a cake, a pie, an apple) and fractions which represent part of a group of similar objects (e.g. "six out of ten students in a class are men," "four out of eight windows are open"). 27) Fractions are part of our everyday lives and this must be taken into account in learning activities aimed at helping students master the concept of fractions. It is necessary not only to use the common words and expressions related to fractions (e.g. one half, one quarter, one third, two thirds), but also to put the students in situations where they must read and write fractions. For example, have them read recipes ($\frac{1}{2}$ cup), durations ($2\frac{1}{2}$ hours), statistics ($\frac{1}{4}$ of the families in my class are single-parent families), and restaurant menus (a $\frac{1}{4}$ or $\frac{1}{2}$ litre of wine). 28) Have the students find the percent sign on bills, receipts, flyers or calculators, or at the bank, for example (use concrete examples to introduce the concept).

OBJECTIVES	NOTES
A 2.06 To calculate percentages using a calculator. A 2.07 To apply a problem-solving approach (reasoning) to everyday situations, using a calculator. A 2.08 To recognize the symbol for degrees Celsius.	31) See Note 29. The students should be made aware that the percentage can raise (taxes) or lower (discount) the amount of a bill. In Step 2, this objective is pursued on a group basis with the aim of finding relevant situations from everyday life. The students may round off the combined percentage of the sales taxes (GST + QST) to 15%, for example, to be able to quickly calculate how much tax they will be paying. The main focus in Step 2 is on the students' needs with respect to this concept. As consumers, the students must regularly calculate percentages. 32) Once the students have learned the concept of percentage, it will be easier for them to learn how to use a calculator to figure out sales tax, interest or the total bill by adding the sales tax or subtracting the discount. See Note 24 on the topic of problem solving.

OBJECTIVES	NOTES
A 2.11 To indicate key points on the temperature scale. A 2.12 To estimate the ambient temperature. A 2.13 To read and write metric units of time.	34) You could give examples from everyday life to show the usefulness of the key points on the temperature scale (e.g. the normal temperature of the human body is 37°C; the freezing point of water is 0°C; a house is comfortable at 20°C). Thus, in the fall, we must set the thermostat at 20°C in order to be comfortable in the house. Once the students have identified the key points on the temperature scale, it will be easier for them to locate a given temperature reading on the scale and understand its significance (e.g. 3°C is close to the freezing point so it is cold). • See Note 34. 35) The idea here is for students to learn to read and write the date and time in numerical form. For example, twenty-five past three in the afternoon on July 8, 1947, is written as follows: 1947-07-08-15:25. Of course, the students must learn these skills by working with everyday situations such as reading and understanding a schedule, writing personal information on a form, and so forth. The students must be able to recognize the symbols or abbreviations used to represent time, such as a (year), m., d, h, min, s. Note the period in the abbreviation for month (m.). This differentiates it from the symbol for metre (m).

OBJECTIVES	NOTES
A 2.14 To establish equivalences between different units of time. A 2.15 To add and subtract units of time in everyday situations.	36) For example: 1 year = 365 days = 52 weeks 1 week = 7 days 1 day = 24 hours 1 hour = 60 minutes 1 minute = 60 seconds You may also talk about equivalences such as $\frac{1}{2}$ hour = 30 minutes, $\frac{1}{4}$ hour = 15 minutes, and $\frac{3}{4}$ hour = 45 minutes. 37) Starting with simple problems, have the adults figure out when they must leave home if they have an appointment at 15:00 and it takes 45 minutes to get there. You could also have them calculate time using an analogue clock or a calendar. When they will have learned addition and subtraction, you could also have them work on problems related to time.

OBJECTIVES	NOTES
A 2.16 To be familiar with the symbols and vocabulary associated with metric units of length.	38) Of course, the metric units referred to here are those most commonly used in everyday life: metre (m), centimetre (cm), millimetre (mm) and kilometre (km). It would not be appropriate to launch into an exhaustive study of units of length, having the students find equivalences between the different units. However, it is important for students to understand and remember the value of each unit by associating it with a concrete object or situation. You may give them a few reference points. For example: 1 mm = the thickness of a dime 1 cm = the width of a fingernail 1 m = the height of a doorknob 1 km = a 12-minute walk Before looking at units of length, have the students measure objects using non-standard units (e.g. a piece of chalk, a chalkboard eraser, a block, a book) to help them see the usefulness of standards such as metric units.

OBJECTIVES	NOTES
A 2.19 To be familiar with the symbols and vocabulary associated with metric units of liquid volume. A 2.20 To estimate quantity in metric units of liquid volume. A 2.21 To use instruments for measuring liquid volume.	41) The units in question are the litre (L) and the millilitre (mL). Just as for metric units of length, there must be a connection with everyday life. For example, you can associate the litre with a carton of milk, and the millilitre with approximately 20 drops of water. It is also important to have the students observe objects around them: soft drink bottles, ice cream containers, perfume bottles, etc. Observing the contents of their kitchen cabinets or reading supermarket flyers helps the students recognize the various units of measurement and the connections between them. 42) Using reference points, the students should be able to tell which <u>metric unit of liquid volume</u> they should use to measure a given item. For example: • a cup of coffee and a bottle of perfume (millilitre) • ice cream and gas (litre) 43) The students will need to learn how to use a measuring cup and measuring spoons to measure liquid volume. Since most measuring cups feature both metric and imperial units, it is easy to establish equivalences (250 mL = 1 cup, 125 mL = $\frac{1}{2}$ cup). Have the students read and make various recipes. The same applies to measuring spoons. If the measuring spoons do not indicate measures in metric and imperial units, have the students write the equivalences down on an index card for easy reference.

OBJECTIVES	NOTES
A 2.22 To be familiar with the symbols and vocabulary associated with metric units of weight. A 2.23 To estimate weight in metric units. A 2.24 To use instruments for measuring weight. A 2.25 To recognize the plus sign.	44) As mentioned earlier, it is important to give the students reference points they can use as mental images (e.g. 1 kg = a box of salt, 1 g = the weight of a cigarette, 1 mg = a measurement for medication). Ask the students to examine objects in their surroundings (e.g. a bag of chips, a stick of butter, a yogurt container). You can then point out that some foods are measured according to their volume and others according to their weight (e.g. frozen yogurt is measured in litres and regular yogurt in grams). 45) Using reference points, the students should be able to tell which <u>metric unit of weight</u> they should use to measure a given item. For example: • a bag of apples (kilogram) • a piece of cheese (gram) • pills (milligram) 46) If possible, bring in a bathroom scale and a kitchen scale so that the students can learn to use them by weighing themselves or by finding the weight of bulk products. They could also read the weights indicated on illustrated scales. 47) Addition and subtraction should be taught simultaneously.

OBJECTIVES	NOTES														
A 2.26 To recognize the minus sign. A 2.27 To use the vocabulary associated with addition. A 2.28 To use the vocabulary associated with subtraction.	- See Note 47. 48) The vocabulary discussed in Step 1 in relation to addition and subtraction included add, more, in all, total, take away, less, left, difference. At this point, the following concepts could be introduced: <table> <tr> <td>more/less</td><td>over/short</td></tr> <tr> <td>carry over/borrow</td><td>a lot/little</td></tr> <tr> <td>all/none</td><td>as many as, the same as /more or less</td></tr> <tr> <td>gain/loss</td><td>rise/drop</td></tr> <tr> <td>profit/loss</td><td>deposit/withdrawal</td></tr> <tr> <td>increase/decrease</td><td></td></tr> <tr> <td>decline, debt, discount, rebate, expense, interest</td><td></td></tr> </table> Understanding these concepts will truly help the students with problem solving. You could ask the students to sort these concepts according to whether they belong under the + or - sign. Oral exercises will improve the students' grasp of these concepts. Have them explain the meaning of a word or expression or use that word or expression in a problem based on an everyday situation and ask them to explain what they would do. - See Note 48.	more/less	over/short	carry over/borrow	a lot/little	all/none	as many as, the same as /more or less	gain/loss	rise/drop	profit/loss	deposit/withdrawal	increase/decrease		decline, debt, discount, rebate, expense, interest	
more/less	over/short														
carry over/borrow	a lot/little														
all/none	as many as, the same as /more or less														
gain/loss	rise/drop														
profit/loss	deposit/withdrawal														
increase/decrease															
decline, debt, discount, rebate, expense, interest															

OBJECTIVES	NOTES
A 2.31 To add numbers using carry-over.	50) It is important to make sure that the students understand what is meant by carry-over and borrowing. Beyond the mechanics of this type of addition, the students should be able to explain what they are doing and why. You may want to encourage them to do manipulation exercises if they are having trouble. See Step 1, Notes 8 and 13. Since numeration is a prerequisite for this objective and the following one, it is important to review certain concepts, such as the values of the digit places and equivalences. For example: 324 = 3 hundreds + 2 tens + 4 ones 324 = 3 hundreds + 1 ten + 14 ones 324 = 2 hundreds + 12 tens + 4 ones You may also draw a parallel with money to show the students that the same value can be expressed in different ways: $\\$20 = 2 \times \\$10 = 4 \times \\$5 = 10 \times \\$2 = 20 \times \\$1$

OBJECTIVES	NOTES
A 2.37 To apply a problem-solving approach (reasoning) to everyday situations (+, -).	54) It is important to give students the opportunity to use their reasoning skills so that they will develop the habit of thinking before they act (calculation). This is done by presenting them with a variety of problems involving either operation. If you give the students a series of addition problems, they will quickly realize that all they need to do is add: they will not read the problems but will add the numbers without applying any kind of reasoning. Working on problems that involve two or more operations will enhance the students' comprehension skills. It is important that these problems be related to the students' everyday lives (e.g. their budget, their job, their salary, groceries, their house). To help the students enhance their reasoning skills, <u>have them come up with</u> problems related to what they are learning. This will force them to think about the relevance of their data, to try to solve the problem themselves in order to determine whether it is realistic, to make sure the data is complete, etc. In doing so, the students must use their judgment. Also, it is a good idea to vary the type of problems you assign to students: • problems with missing figures • problems with extra figures • problems without numbers • problems with more than one answer

OBJECTIVES	NOTES
A 2.38 To become familiar with the calculator. A 2.39 To use a calculator. A 2.40 To check results obtained using a calculator. A 2.41 To recognize the multiplication sign.	Another approach is to ask the students to formulate a question on the basis of given data or to assign problems with unrealistic figures (the baby weighed 53 kg at birth). There are many sources to which you can refer for information on how to help adult learners develop a problem-solving strategy. See Appendix 3. • See Note 22. 55) The focus will be on addition and subtraction. At this stage, the calculator is to be used only to check the results of calculations done by hand. 56) The idea here is for the students to be able to tell whether the result they obtain using the calculator is correct. For example: $3.75 + 12.99 + 5 = ?$. The students get 16.79. If they estimate mentally, they will round off the numbers: $4 + 13 + 5 = 22$. This will help them see whether they might have made a mistake when keying in the numbers on the calculator. 57) Keep in mind the notes in Step 1 on the importance of teaching multiplication and division simultaneously.

OBJECTIVES	NOTES
A 2.50 To divide sums of money. A 2.51 To multiply a number by 10, 100 and 1000 using mental calculation. A 2.52 To divide a number by 10, 100 and 1000 using mental calculation.	• See Note 64. 65) The students could be made to realize how easy it is to multiply a number by 10, 100 or 1000. Without going into too much detail, you may want to introduce the concept of decimals. For example, have the students round off the amount of a restaurant bill and then estimate the amount of tax to be added on. Even if the tax rate is 7%, 8% or 9%, have the students calculate it at 10% so that they can have an approximate idea of the amount of tax to be paid.

OBJECTIVES	NOTES
A 2.57 To multiply and divide using a calculator. A 2.58 To apply a problem-solving approach (reasoning) to everyday situations ($\times$, $\div$).	68) At this point, the students should use their calculators to check their written calculations. 69) Note 54 also applies to multiplication and division. You can create learning situations or case studies in which the students must set out the different steps in the problem-solving process and determine the order of the operations to be performed, writing the corresponding mathematical statement. Given an everyday situation, the students could write all of the steps in their solution as mathematical statements, without calculating right away. All this will help the students think before beginning to calculate. For example: I have \$20. I am going to buy milk at \$0.99, bread at \$1.47, a magazine at \$2.95 and cigarettes at \$5.25. a) How much will my purchases cost? b) How much money will I have left?

OBJECTIVES	NOTES
	a) I must calculate my total purchases: Calculations $ \begin{array}{r} \$0.99 + \$1.47 + \$2.95 + \$5.25 = \\ 0.99 \\ 1.47 \\ 2.95 \\ + 5.25 \\ \hline 10.66 \end{array} $ My purchases total <u>\$10.66</u> b) To find out how much money I will have left, I must find the difference between the initial amount of money and the total purchases: Calculations $ \begin{array}{r} 20.00 \\ - 10.66 \\ \hline 9.34 \end{array} $ \$20 - \$10.66 = I have <u>\$9.34</u> left. The students need to learn to organize data, prioritize the different steps and calculate only when they are absolutely sure of what they are doing. This objective, which includes the four operations (+, -, x, ÷) must be seen in depth since students need this knowledge in order to understand the material covered in subsequent steps. The students must be able to calculate, sort, classify, understand concepts, generalize, and so on.

OBJECTIVES	NOTES
	The students should work as a group or in teams with the following scenarios: • preparing for a trip (e.g. car, gas, meals, hotel) • preparing a budget for redecorating a room This will help them learn to verbalize what they are doing, to interact and develop strategies, while analyzing data. You might want to introduce the concept of percentage in relation to sales tax. When dealing with sales tax, however, allow the students to use a calculator, since the written calculation of percentages will be seen only in Step 4.

STEP 3

INTRODUCTION

In the third step, the students will acquaint themselves with proper fractions and decimals and acquire a greater understanding of the concepts related to metric units.

They will begin with proper fractions, working primarily with concrete examples that can be visualized and that are related to their real needs. Actually, we do not encounter fractions often in everyday life. It is true that we use them in cooking, but more for measuring than for mathematical operations. As a rule, in construction and mechanics we use the International System of Units (SI). Fractions have always been considered a difficult concept to teach because some of the operations require a certain amount of mental gymnastics (e.g. adding different denominators). That represents quite a challenge for adults who have difficulty with abstractions and conceptualizing. WE MUST NOT FORGET THAT IN CUSTOMIZED LITERACY TRAINING THE FINAL OBJECTIVE IS TO MAKE THE STUDENTS AUTONOMOUS IN EVERYDAY LIFE. Of course, the students may learn at different rates, depending on whether or not they have learning difficulties. A number of students lose heart and give up when faced with learning fractions. That is why they will study fractions through concrete situations, so that the students can visualize what is happening and better understand this concept (e.g. $\frac{1}{2}$ cup + $\frac{1}{4}$ cup = $\frac{3}{4}$ cup). It is rarely necessary to understand all the techniques related to fractions to get on in life. Students who do have particular needs requiring a greater knowledge of fractions can always be directed to the presecondary level to accomplish this.

Next the students will study decimals. This chapter is one of the closest to everyday life. After all, the monetary system and the metric system are based on the decimal system. To help the students to become autonomous as quickly as possible, we will focus on the decimal system so that they can apply it in their daily lives. For instance, we will relate decimals to the grocery bill or the electric bill. Whether they are cooking, sewing or doing handiwork or mechanical work, they will have to use numbers involving a decimal point. Hence, it will be easy to work with real situations and the students will be encouraged to use calculators, at least at first. Customized literacy training aims at enabling the students to understand decimals. Calculators will always be necessary for exact calculations. As soon as the students are able to apply the knowledge they have acquired, they can be shown how to do written calculations, which represents an additional skill.

Once these concepts have been assimilated, the students will easily understand equivalent metric units. They will be able to give precise measurements (1.36 m), find equivalent units (96 cm = 0.96 m) and perform operations involving them (1.36 m – 96 cm = 0.40 m).

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.01 TO RECOGNIZE PROPER FRACTIONS IN EVERYDAY SITUATIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize proper fractions in everyday situations. (N) Before presenting the concept of fractions and the related vocabulary, it is important to encourage the students to find out where they are likely to encounter fractions in everyday life.	• Have the students identify from 3 to 5 situations that involve fractions. For example: - in a recipe: $\frac{1}{2}$ cup - at the restaurant: $\frac{1}{4}$ litre - at the bank: $7\frac{3}{4}\%$ interest - at work: time and a half, $\frac{1}{4}$ hour break, $\frac{1}{2}$ hour for lunch - in statistics: $\frac{3}{10}$ of the population, $\frac{3}{4}$ of single-parent families

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.02 TO RECOGNIZE NUMERICAL REPRESENTATIONS OF FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize that: a straight line (–) or a slash (/) between two numbers, such as or $\frac{3}{4}$, means 3 over 4; and that these symbols are used to represent fractions. (N) It is better to use a horizontal bar ($\frac{a}{b}$) rather than a slash (a/b). The former is closer to the relation a over b and is used to represent such things as percentages, the rule of three and geometric formulas. For example: • $\frac{1}{8}$ of a pizza = one out of eight slices of pizza • $\frac{bxh}{2}$ = base times height divided by 2 • $\frac{8}{100} \times 96 = 8 \times 96$ divided by 100 C² The fractions used are taken from everyday life; their denominators are positive and ≤ 12.	• Have the students recognize fractions in texts that contain whole numbers and decimals or fractions. For example: - To make biscuits, I need the following ingredients: 1 cup of flour 2 cups of milk $\frac{1}{2}$ teaspoon of salt $\frac{3}{4}$ cup of oil - I have 3 children aged 8, 5 and $2\frac{1}{2}$.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.03 TO RECOGNIZE WHAT A FRACTION IS: PERCEIVING A FRACTION AS PART OF A WHOLE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) To explain the concept of fractions, make frequent use of manipulation exercises and include a wide variety of concrete situations or presentations. The students should have the clearest possible idea of what a fraction is and the type of relation produced between the two quantities. Consequently, from the beginning, the students should acquaint themselves with the two types of fractions: that is, fractions that represent part of a single object, and fractions that represent part of a group of similar objects. C¹ To be able to relate fractions to drawings that represent an object divided into x parts: • to recognize a piece of a whole • to recognize pieces of a whole • to count the total number of pieces in a whole	• Draw a pizza on the board, divide it into 8 slices, then: - have the students identify the value of one slice, that is, $\frac{1}{8}$. - have them identify the value of several slices, that is, $\frac{3}{8}$, $\frac{5}{8}$, etc. - have them name the fraction represented in a drawing such as the one below:  $\frac{2}{8}$ • Invent a number of situations involving a whole.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.04 TO RECOGNIZE WHAT A FRACTION IS: PERCEIVING A FRACTION AS PART OF A GROUP OF SIMILAR OBJECTS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to associate a fraction with a drawing representing a group of similar objects divided into sub-groups: - to recognize that the group of objects form a whole - to divide the group into 2 or more equal parts - to determine the number of elements contained in each sub-group, given a fraction - to name the fraction represented by a sub-group For example: 4 items = $\frac{1}{3}$ of a group of 12 (N) This concept should always be presented in a visual or concrete manner: drawings, cardboard constructions, measuring cups, rulers, objects or people.	- Form a group of 12 students, then: - have the students break up into equal teams of 2, 3, 4 or 6 - have them break up into a given number of teams - have them state how many students there are in each team and what fraction of the group the team represents: 2 teams of 6: each team represents $\frac{1}{2}$ of the group 4 people per team: each team represents $\frac{1}{3}$ of the group 4 teams of 3: each team represents $\frac{1}{4}$ of the group 6 teams of 2: each team represents $\frac{1}{6}$ of the group

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.04 TO RECOGNIZE WHAT A FRACTION IS: PERCEIVING A FRACTION AS PART OF A GROUP OF SIMILAR OBJECTS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	- Starting with a group of x people and a given fraction, have the students answer questions such as: - If $\frac{1}{4}$ of the people are men, how many men are there? - If $\frac{1}{3}$ of the people are wearing glasses, how many people are wearing glasses?

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.05 TO READ PROPER FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) To help the students fully understand fractions, have them do manipulation exercises. For instance, using measuring cups is a concrete means of learning this concept. Having the ability to read also means having the ability to understand quantitative expressions. For instance, $1\frac{1}{4}$ cup is one and a quarter cups. C¹ To be able to read quantities expressed in the form of fractions or mixed numbers in everyday life. The denominators are positive and ≤ 12. C² To be able to measure a given quantity in a measuring cup (e.g. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{4}$ cup).	• Have the students read the fraction represented in a drawing. • Have them complete a drawing to obtain the representation of a given fraction. • Have them distinguish $\frac{1}{2}$ hour, $\frac{1}{4}$ hour and $\frac{3}{4}$ hour on a clock. • Have them represent $\frac{1}{2}$ hour, $\frac{1}{4}$ hour and $\frac{3}{4}$ hour on a clock. • Have them make up a work or school schedule with the time required for the different activities indicated using fractions and whole numbers.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.05 TO READ PROPER FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C³ To be able to measure a quantity between 1 and 2 cups using a measuring cup (e.g. $1\frac{1}{2}$, $1\frac{1}{4}$, $1\frac{1}{3}$, $1\frac{2}{3}$, $1\frac{3}{4}$ cups). C⁴ To be able to: • read a recipe • read statistics involving fractions • read a fraction or a mixed number	• Have the students partially fill a cup with water and then report the amount of water poured into the cup. Present a variety of manipulation exercises. • Show drawings representing measuring cups filled to different levels and have the students read the different amounts. • Have the students suggest exercises, drawings and situations related to the concepts under study.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.06 TO WRITE PROPER FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to do the following in everyday situations: • write quantities expressed as fractions or mixed numbers, as when taking down a recipe • write a fraction as a number • write the numerical equivalent of a fraction expressed as a drawing • write the following fractions correctly: - $\frac{1}{2}$, one half - $\frac{1}{4}$, one quarter - $\frac{1}{3}$, one third - $\frac{2}{3}$, two thirds - $\frac{3}{4}$, three quarters	• To give the students an even better understanding of what fractions are, ask one of them to fold a sheet of paper in 2, another in 4, and another in 8 and then point out how different fractions can be obtained from sheets of paper of the same size.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.06 TO WRITE PROPER FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
• name and write fractions with a denominator that is positive and ≤ 12 • write out given fractions C² To be able to see a fraction as part of a whole. C³ To be able to see a fraction as part of a group of objects. C⁴ To be able to reconstitute a whole number from a fraction. C⁵ To be able to recognize a whole number in forms such as: $\frac{8}{8}$, $\frac{5}{5}$ and $\frac{12}{12}$.	• Have the students cut up a sheet of paper and determine the value of the pieces. • Verify if the students have understood fractions by asking them to give the value of the shaded portion of a drawing like the one below. 

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.07 TO COMPARE DIFFERENT FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Since the students should begin by learning about the role of the denominator, only 1 will be used as the numerator. Later, with the help of drawings, the students will be asked to compare two fractions (e.g. $\frac{3}{4}$ and $\frac{1}{2}$). In customized literacy training, it is essential for the students to be able to work with concrete examples or drawings in order to understand the concepts they are studying. For instance, comparisons must involve objects such as measuring cups that are a quarter ($\frac{1}{4}$) full, a third ($\frac{1}{3}$) full or half ($\frac{1}{2}$) full, drawings illustrating the same quantities, or teaching materials such as <i>Fractions-Circles</i>.¹	

¹“Fractions-Circles” or “Fraction Squares,” available at Moyer’s, 801 Saint-Germain, Ville Saint-Laurent, Québec, H4L 3R7, Tel.: 1-800-361-5944.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.07 TO COMPARE DIFFERENT FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to compare quantities which have 1 as the numerator and a positive denominator ≤ 12, using concrete objects or illustrations. For example: $\frac{1}{4} < \frac{1}{2}$	• Have the students compare quantities using measuring cups. • Have them compare $\frac{1}{2}$ hour, $\frac{1}{4}$ hour and $\frac{3}{4}$ hour on a clock. • Have them divide sheets of coloured paper in various ways (e.g. yellow in 2, pink in 3), then have them compare a pink piece with a yellow piece, as well as the value of each one. Have them write a numerical expression such as $\frac{1}{2} > \frac{1}{3}$ or $\frac{1}{2} < \frac{2}{3}$.
C² To be able to compare quantities which have a different numerator but the same denominator, using concrete objects or illustrations. For example: $\frac{1}{4} < \frac{2}{3}$	
C³ To be able to compare fractions with different numerators and denominators, using concrete objects or illustrations. For example: $\frac{1}{2} < \frac{2}{3}$	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.08 TO USE THE VOCABULARY ASSOCIATED WITH PROPER FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Introduce the students to the vocabulary associated with proper fractions in the course of their learning activities and according to their abilities. C¹ To be able to use the vocabulary associated with proper fractions: • whole number/fraction • numerator/denominator • mixed number/improper fraction • multiple/divisor • equivalent fractions/simplification • least common multiple/greatest common divisor	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.08 TO USE THE VOCABULARY ASSOCIATED WITH PROPER FRACTIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) In customized literacy training, this vocabulary is pertinent when it helps the students understand the concept under study. The vocabulary should only be used when necessary and only after the concept has been learned. Use the words “numerator” and “denominator” when the students have understood the concept of fractions. When the students understand $\frac{1}{4}$ cup, $\frac{2}{4}$ cup and $\frac{3}{4}$ cup, the teacher can refer to 1, 2 and 3 as numerators and 4 as the denominator, which indicates how many parts the cup has been divided into. Fractions and whole numbers are presented at the same time as the concept of fractions. The terms “improper fraction” and “mixed number” can be used after the fractions are added. In the same way, equivalent fractions and simplification can be so named after the results of adding and subtracting are arrived at.	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.09 TO ADD FRACTIONS WITH THE SAME DENOMINATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to add fractions < 1 that have the same denominator, which is positive and ≤ 12. (N) Learning to add fractions can only be accomplished with the help of concrete objects or drawings. The students will have to grasp the fact that quarters + quarters add up to quarters, that is: $\frac{3}{4} + \frac{3}{4} = \frac{6}{4}, \text{ or } 1 \frac{2}{4}.$ With the help of drawings, the students will be able to understand mixed numbers and improper fractions. Working with familiar objects such as pies, cakes, pizzas or measuring cups will help the students understand what they are learning.	• Have the students use rulers or anything else that enables them to add fractions. • Have them work with measuring cups (2-cup capacity). • Have them work with a clock.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.09 TO ADD FRACTIONS WITH THE SAME DENOMINATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C² To be able to add two quantities and express the sum in everyday language. The denominator must be positive and ≤ 12. For example: $\frac{3}{4} \text{ cup} + \frac{1}{4} \text{ cup} = \frac{4}{4}, \text{ or } 1 \text{ cup}$ $\frac{3}{4} \text{ cup} + \frac{3}{4} \text{ cup} = 1 \frac{1}{2} \text{ cups}$ (N) The students can observe that addition on paper ($\frac{3}{4} + \frac{3}{4} = \frac{6}{4}$) and the content of the measuring cup ($1 \frac{1}{2}$ cups) are equivalent. Improper fractions and mixed numbers can be so named and studied.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.10 TO SUBTRACT FRACTIONS WITH THE SAME DENOMINATOR.

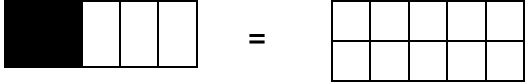
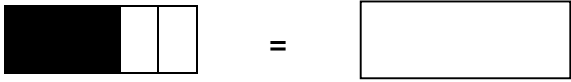
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to subtract fractions < 1 that have the same denominator, which is positive and ≤ 12.	• Present a problem such as the following: Three customers in a restaurant each receive a pizza cut into 8 slices. They all eat part of their pizza and take the rest of it home. Write a fraction representing the amount of pizza each one takes home. - The first customer eats 5 slices, that is: $\frac{8}{8} - \frac{5}{8} = \frac{3}{8}.$ - The second customer eats 7 slices, that is: $\frac{8}{8} - \frac{7}{8} = \frac{1}{8}.$ - The third customer eats 4 slices, that is: $\frac{8}{8} - \frac{4}{8} = \frac{4}{8}.$ • Have the students do several different exercises so that they realize that the whole is $\frac{8}{8}$.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.10 TO SUBTRACT FRACTIONS WITH THE SAME DENOMINATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	• Have them do addition and subtraction based on their daily experience. For example: - $\frac{3}{4}$ of the children in the school belong to single-parent families. What fraction represents the number of children who live with both their parents? - $\frac{5}{8}$ of the windows are closed. What fraction represents the number of windows that are open?

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.11 TO FIND A FRACTION THAT IS EQUIVALENT TO A GIVEN FRACTION.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Money can be used to help the students understand the concept. For instance, \$1 is equivalent to 4 x 25 ¢, to 10 x 10¢, to 20 x 5 ¢ or to 100 x 1 ¢. This exercise will enable the students to recognize that the sum of money is always the same but that it is represented differently. It is the same with $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$. C¹ To be able to find a fraction that is equivalent to a given fraction. The denominators are positive and ≤ 12. C² To be able to recognize equivalent fractions.	- Have the students complete the second figure by shading the equivalent part and then write the fraction corresponding to the figure.  $\frac{2}{5} = \underline{\hspace{2cm}}$ - Increase the difficulty by asking the students to draw an equivalent fraction and then name it.  $\frac{3}{5} = \underline{\hspace{2cm}}$ - Working with coloured sheets of paper, rulers, teaching materials for fractions or any other concrete material, have the students do equivalences.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

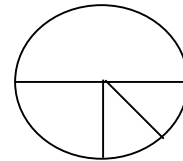
OBJECTIVE: A 3.11 TO FIND A FRACTION THAT IS EQUIVALENT TO A GIVEN FRACTION.

NOTES (N) AND CONTENT (C)

SUGGESTED ACTIVITIES

- To verify if the students have mastered the concept of equivalence, have them find equivalences in a drawing.

For example:



Find two fractions equivalent to $\frac{1}{2}$.

- Have the students use rulers to find equivalences between $\frac{1}{2}$ and $\frac{x}{4}$, $\frac{x}{8}$, $\frac{x}{6}$, etc.
- Using a clock, point out that $\frac{1}{2}$ hour is equivalent to $\frac{2}{4}$ hour, but that people always say half an hour.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.12 TO SIMPLIFY OR REDUCE A FRACTION TO ITS LOWEST TERMS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Often, the students are able to simplify fractions quickly without really understanding what they have done. That is why it is important to have them do manipulation exercises. C¹ To be able to simplify a fraction given concrete or instructional material. The denominator is positive and ≤ 12.	Situations used to attain previous objectives can be used again to help the students understand equivalent fractions and the connection between simplification and equivalent fractions. For example: $\frac{2}{4}$ hour = $\frac{1}{2}$ hour

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.13 TO RECOGNIZE THE EQUIVALENCE BETWEEN A MIXED NUMBER AND AN IMPROPER FRACTION WITH THE SAME DENOMINATOR.

NOTES (N) AND CONTENT (C)

(N) With the help of concrete objects, the students must do numerous exchanges of whole numbers for quarters, halves, etc., so that they fully understand the concept. This technique should not be studied until the students understand equivalence with the help of concrete objects or drawings.

SUGGESTED ACTIVITIES

- Present mixed numbers in the form of objects or drawings and ask the students the following questions:



- What quantity is represented? _____
- If someone divides the whole into 4 equal parts, that is, $\frac{1}{4}$ each, how many will there be?

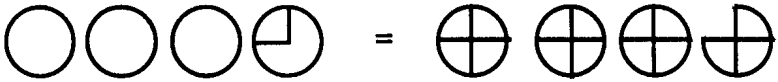
- Is $1\frac{1}{4}$ the same quantity as $\frac{5}{4}$?
- What is the role of the numerator 5?
- What is the role of the denominator 4?

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.13 TO RECOGNIZE THE EQUIVALENCE BETWEEN A MIXED NUMBER AND AN IMPROPER FRACTION WITH THE SAME DENOMINATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) These two concepts must be explained in different ways before presenting the transformation technique. In fact, the students may seem to understand the concepts, but they soon adopt a single technique and forget the principle behind these concepts. At first, they seem to have attained the objective, but in the long term it is evident that they have soon forgotten it. That is why the concepts cannot be assimilated if the students do not do numerous manipulation exercises, at different times, so that they solidly reinforce the things they are learning and thereby achieve long-term understanding, which enables them to generalize their knowledge. C¹ To be able to give the represented value as a mixed number or as an improper fraction, using concrete objects or illustrations.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.14 TO CHANGE A MIXED NUMBER INTO AN IMPROPER FRACTION.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to change a mixed number into an improper fraction and show the result in a drawing. The denominator is positive and ≤ 12. (N) Working with concrete situations, the students can divide things without actually using division. In fact, with the help of drawings, they can find the number of quarters, the number of halves, etc.	- Present problems such as: - You have 2 pies. How many quarters do you have in all? Make a drawing of this. Answer: $2 \frac{1}{4} = \frac{9}{4}$  The diagram shows two circles representing whole pies, followed by a quarter-circle sector representing 1/4 of a pie. This is followed by an equals sign, then two circles each divided into four equal quadrants (representing 2 whole pies), followed by one full quadrant (representing 1/4 of a pie). Together, these represent 9 quarters. - You have been working for 3 hours. State this time as an improper fraction. Prove your statement with the help of a drawing.  The diagram shows three circles representing whole pies, followed by a half-circle sector representing 1/2 of a pie. This is followed by an equals sign, then three circles each divided into two equal halves (representing 3 whole pies), followed by one full half (representing 1/2 of a pie). Together, these represent 7 halves.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.14 TO CHANGE A MIXED NUMBER INTO AN IMPROPER FRACTION.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	Have the students invent problems that oblige them to find the number of quarters, halves, thirds, etc.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.15 TO CHANGE AN IMPROPER FRACTION INTO A MIXED NUMBER.

NOTES (N) AND CONTENT (C)

C¹ To be able to reconstitute whole numbers from improper fractions and show the results in a drawing. The denominator is positive and ≤ 12 .

SUGGESTED ACTIVITIES

- Present a problem such as:

A baker realizes that he has 11 pieces of blueberry pie left. Knowing that he divides his pies in 6, state what he has left as an improper fraction.

How many pies does he have left?

Make a drawing of what you have found (dividing the pies into 6 parts).

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.16 TO COMPARE TWO FRACTIONS USING A TABLE OF FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Remember that you should always have the students work with concrete situations because, in literacy training, the concept of a fraction is only understood to the degree that it answers a precise need of the students. Consequently, pursuing an objective without basing the work on everyday reality is artificial and will prove to be counterproductive in the long run. C¹ To be able to compare two fractions using a table of fractions. The denominators are positive and ≤ 12 (see Appendix 4). C² To be able to find equivalent fractions, using a table. (N) By referring to previous exercises, the students can find the technique used to solve the equations below: $\frac{1}{2} = \frac{x}{4}, \frac{1}{2} = \frac{x}{6}, \frac{1}{2} = \frac{x}{8}, \frac{1}{2} = \frac{x}{10}, \frac{1}{2} = \frac{x}{12}$	Have the students compare two fractions, using a table of fractions. $\frac{1}{3} < \frac{1}{2}$ $\frac{3}{4} > \frac{2}{3}$ For example: $\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$ $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.17 TO ADD TWO FRACTIONS, ONE OF WHOSE DENOMINATORS IS A MULTIPLE OF THE DENOMINATOR OF THE OTHER.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to add two fractions when the denominator of one is a multiple of the denominator of the other. The denominators are positive and ≤ 12. The answer should be reduced to its lowest terms. (N) To attain this objective, the students must master and successively use what they have learned so far. They often experience difficulties at this stage because they must conceptualize the following steps: • finding the common denominator • changing to the same denominator using the equivalent fraction • carrying out the operation • simplifying, if it is possible to do so • changing the result into a mixed number, if it is possible to do so If the students really need to do this type of addition in their daily lives and they have difficulty synthesizing the steps in the procedure, a measuring cup can be used to help them understand what they are doing.	• Have the students add the following fractions, using concrete objects. Example A: $\frac{1}{2} + \frac{1}{4} = ?$ - $\frac{1}{2}$ cup + $\frac{1}{4}$ cup = $\frac{3}{4}$ cup - $\frac{2}{4}$ cup + $\frac{1}{4}$ cup = $\frac{3}{4}$ cup - Answer: $\frac{3}{4}$ cup Example B: $\frac{3}{4} + \frac{1}{2} = ?$ - $\frac{3}{4}$ cup + $\frac{1}{2}$ cup = ? - $\frac{3}{4}$ cup + $\frac{2}{4}$ cup = $\frac{5}{4}$ cup - Answer: $1 \frac{1}{4}$ cups Example C: $\frac{1}{2}$ hour + $\frac{1}{4}$ hour = $\frac{3}{4}$ hour $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.17 TO ADD TWO FRACTIONS, ONE OF WHOSE DENOMINATORS IS A MULTIPLE OF THE DENOMINATOR OF THE OTHER.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	• Invent as many concrete situations as possible so that the students can grasp the concept and then apply and assimilate what they have learned.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.18 TO ADD TWO FRACTIONS WITH PRIME DENOMINATORS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Start off with concrete situations such as adding $\frac{1}{2}$ and $\frac{1}{3}$ or $\frac{1}{4}$ and $\frac{1}{3}$. C¹ To be able to use a table of fractions to find a common denominator (see Appendix 4). C² To be able to add two fractions when the denominator is a prime number, positive and ≤ 12. The answer should be reduced to its lowest terms. (N) By frequently doing manipulation exercises, the students will more readily grasp the concept of a common denominator.	- Present a sheet of white paper as a unit, then have the students cut a sheet of pink paper in 2 equal parts ($\frac{1}{2}$), a sheet of blue paper in 3 equal parts ($\frac{1}{3}$) and a sheet of green paper in 6 equal parts ($\frac{1}{6}$). Next, have the students recognize the value of each of the resulting pieces of paper. - Point out that the students can exchange a pink piece of paper for 3 green pieces and a blue piece of paper for 2 green pieces and therefore obtain the following equivalences: $\frac{1}{2} = \frac{3}{6} \text{ or } \frac{1}{3} = \frac{2}{6}$ Note: The colours chosen are not important. It is the difference between the colours that makes it possible to say that 2 greens equal 1 blue or that 3 greens equal 1 pink.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.19 TO ADD A FRACTION AND A MIXED NUMBER OR A WHOLE NATURAL NUMBER, OR TO ADD TWO MIXED NUMBERS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to add mixed numbers or a mixed number and a fraction, when the denominators are positive and ≤ 12. • with the same denominator • with a denominator that is a multiple of the other denominator • with different denominators that are prime numbers (N) Many exercises can be done using working hours.	• Propose a problem such as the following: Peter worked 4 days this week: Monday: $4\frac{1}{2}$ hours, Wednesday: $3\frac{3}{4}$ hours, Thursday: 4 hours and Friday: $2\frac{1}{2}$ hours How many hours did he work this week?

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.20 TO SUBTRACT A FRACTION FROM A MIXED NUMBER OR SUBTRACT TWO MIXED NUMBERS WITHOUT BORROWING.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Use the procedures studied previously for addition and transfer them to a context involving subtraction. C¹ To be able to subtract mixed numbers or a mixed number and a fraction whose denominators are positive and ≤ 12. • with the same denominator • with a denominator that is a multiple of the other denominator • with different denominators that are prime numbers	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.21 TO SUBTRACT A FRACTION OR A MIXED NUMBER FROM A MIXED NUMBER WITH THE SAME DENOMINATOR BY BORROWING.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Using everyday situations, present vertical subtraction retaining the mixed numbers as given in the problem. If necessary, explain borrowing. C¹ To be able to subtract mixed numbers or a mixed number and a fraction whose denominators are positive and ≤ 12. (N) In the present context, it is not necessary to insist on a simplified answer.	- Present a problem such as the following: At the pizzeria, Tony cuts the pizzas into 6 slices and sells them 1 slice at a time. For lunch, Tony prepares 8 pizzas with 6 slices each. Calculate how many pizzas he has left after he serves the following customers. - The first customer orders 2 slices of pizza ($\frac{2}{6}$): $8 - \frac{2}{6} = 7 \frac{4}{6}$. - The second customer orders 3 slices ($\frac{3}{6}$): $7 \frac{4}{6} - \frac{3}{6} = 7 \frac{1}{6}$. - The third customer orders 5 slices ($\frac{5}{6}$): $7 \frac{1}{6} - \frac{5}{6} = 6 \frac{2}{6}$. - Ask the students to represent each of the situations with the help of drawings or teaching materials.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.22 TO SUBTRACT TWO FRACTIONS, ONE OF WHOSE DENOMINATORS IS A MULTIPLE OF THE DENOMINATOR OF THE OTHER.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Use the procedures studied previously for addition and transfer them to a context involving subtraction. C¹ To subtract two fractions, one of whose denominators is a multiple of the denominator of the other. The denominators are positive and ≤ 12.	Present a problem such as the following: You have $\frac{1}{2}$ cup of sugar. If you use $\frac{1}{4}$ cup for a recipe, how much sugar will you have left?

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.23 TO SUBTRACT TWO FRACTIONS WITH PRIME DENOMINATORS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Use the procedures studied previously for addition and transfer them to a context involving subtraction. C¹ To subtract two fractions whose denominators are prime, positive and ≤ 12.	• Use everyday situations such as calculating working hours or measuring quantities for a recipe.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.24 TO SUBTRACT A FRACTION FROM A MIXED NUMBER OR A NATURAL WHOLE NUMBER, OR TO SUBTRACT ONE MIXED NUMBER FROM ANOTHER BY BORROWING.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) See the comments related to the previous objectives. C¹ To be able to subtract a fraction from a mixed number or from a natural whole number, or to subtract one mixed number from another by borrowing. The denominators are positive and ≤ 12.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.25 TO MULTIPLY A WHOLE NUMBER BY A FRACTION.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) To help the students understand this concept it is important to start off with concrete situations such as: • taking $\frac{1}{4}$ of one's salary to pay the rent • reading $\frac{3}{5}$ of a book The technique $\frac{3}{5} \times 275 = \frac{825}{5} = 165$ is very abstract. The students do not always know what to do, because they do not have a concrete example to help them understand the concept of multiplying by a fraction. For this reason, a procedure such as the rule of three will help them understand what is happening. Afterward, the students will be able to deal with this type of problem because they will have an idea of what they are doing. C¹ To be able to multiply a whole number by a fraction. The denominator is positive and ≤ 12.	• Present a procedure such as the rule of three to explain the meaning of multiplication. For example: My book is 275 pages long. I have already read $\frac{3}{5}$ of it. How many pages have I read? The procedure consists in taking the total number of pages of my book divided into 5 parts, that is $275 \div 5 = 55$ pages, and reasoning that if $\frac{1}{5}$ equals 55 pages, then $\frac{3}{5}$ will be 3 times as much, or 165 pages. • Suggest activities related to salaries, budgeting or employment insurance.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.26 TO MULTIPLY TWO FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to multiply two fractions whose numerators are 1 and whose denominators are positive and ≤ 12 , using concrete objects.	- Use recipes. At first, use only the measurements, $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{1}{4}$. For example: I want to make half a recipe. - half of $\frac{1}{3}$ cup = $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ cup - half of $\frac{1}{2}$ cup = $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ cup - half of $\frac{1}{4}$ cup = $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$ cup - Use any other material that can show the results of multiplication, such as <i>Fractions-Circles</i>.²

²“Fractions-Circles” or “Fraction Squares,” available at Moyer’s, 801 Saint-Germain, Ville Saint-Laurent, Québec, H4L 3R7, Tel.: 1-800-361-5944.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.27 TO MULTIPLY A FRACTION BY A MIXED NUMBER.

NOTES (N) AND CONTENT (C)

C¹ To be able to multiply a fraction by a mixed number using concrete objects. The numerator of the fraction is 1 and the denominators are positive and ≤ 12 .

SUGGESTED ACTIVITIES

- Here is a recipe for pineapple pudding that I need to divide in 2.

- 6 slices of pineapple:

$$\frac{1}{2} \times 6 = \frac{6}{2} = 3 \text{ slices}$$

- $1\frac{1}{2}$ cups of all-purpose flour:

$$\frac{1}{2} \times 1\frac{1}{2} = \frac{1}{2} \times \frac{3}{2} = \frac{3}{4} \text{ cup}$$

- $\frac{2}{3}$ cup of sugar:

$$\frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3} \text{ cup}$$

- $\frac{1}{4}$ cup of brown sugar:

$$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8} \text{ cup}$$

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.28 TO DIVIDE A WHOLE NUMBER BY A FRACTION.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The division of fractions is dealt with only if concrete situations arise, such as wanting to know the answer to the following questions: - Given 8 pies, how many portions will I have if each piece represents $\frac{1}{6}$ of the total amount of pie? - Given 2 cakes, how many guests can I serve if each piece represents $\frac{1}{8}$ of the total amount of cake? - How many $\frac{1}{4}$ litre glasses can I fill with 6 litres of wine? Since it is important that the students understand division involving fractions, they must observe a number of visual demonstrations to understand the result (e.g. have them divide 4 pies so that each portion represents $\frac{1}{6}$ of the total amount of pie). The students should only divide fractions with the help of drawings or concrete objects so that in any other situation they can duplicate the operations performed and arrive at an idea that they can generalize.	- Create a workshop for devising suitable learning situations. - Have the students invent learning situations. In doing this, the students will also familiarize themselves with the concept of division, which will help them better understand the operations involved.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.28 TO DIVIDE A WHOLE NUMBER BY A FRACTION.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to divide a whole number by a fraction. The numerator is 1 and the denominator is positive and ≤ 12.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.29 TO CHANGE A PROPER FRACTION INTO A DECIMAL.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to change a proper fraction into a decimal. (N) Since it is not possible to work with fractions using a calculator, it is important to show the students how to change these fractions into decimals ($\frac{3}{4} = 3 \div 4 = 0.75$) and do the calculations with a calculator. An interest rate of $12\frac{3}{4}$ expressed as a decimal is 12.75%. The students must learn how to work with a calculator. Because of this and so that the students can quickly find the answers to problems without elaborate calculations, show them how to change a proper fraction into a decimal. Students who have difficulty retaining concepts and techniques for any length of time will be greatly helped by this approach.	• Have the students solve problems involving fractions, but with the help of a calculator. Interest rates may be studied in this way.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.29 TO CHANGE A PROPER FRACTION INTO A DECIMAL.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
It will also help the students if, on a sheet of paper or an index card, they outline the procedure for changing proper fractions into decimals and then apply the procedure to solve a problem with their calculators.	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.30 TO ESTIMATE THE RESULTS OF THE FOUR BASIC OPERATIONS WITH THE MOST COMMON FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to estimate the results of the four basic operations with the most common fractions. The denominators are positive and ≤ 12. (N) Working mainly with halves, thirds, quarters or eighths, help the students understand addition, subtraction, division and multiplication of fractions with the same denominator. Working with real situations keeps the students from seeing mathematics as a game that is unrelated to everyday life. Measuring cups still offer the best means of demonstrating mathematical operations.	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.31 TO APPLY A PROBLEM-SOLVING APPROACH (REASONING) TO EVERYDAY SITUATIONS INVOLVING PROPER FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to apply a problem-solving approach to everyday situations. (N) When you give students problems that they can associate with personal experience, they tend to retain what they have learned. You can help them work out strategies for solving written problems by having them work on the problems in a group (e.g. discussion, exchange of ideas, justification of solutions chosen). In addition, you can ask them to think of problems to solve. In formulating the elements of a problem and asking questions, the students structure their thoughts and assimilate the concepts under study. It is important to realize that the concepts studied above were examined in relation to everyday situations. Indeed, all learning should be related to everyday reality in order to encourage the formation of mental pictures with which the students can associate concepts.	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.31 TO APPLY A PROBLEM-SOLVING APPROACH (REASONING) TO EVERYDAY SITUATIONS INVOLVING PROPER FRACTIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
If a student has a specific need related to fractions that is not dealt with in this step (e.g. measuring a sixteenth), then that person can ask for additional explanations. It is important to find a procedure or a tool such as a sheet of examples that the students can refer to later on. Lastly, students who wish to know more and have the capacity to learn more can enrol in the presecondary program to further expand their knowledge.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.32 TO USE THE VOCABULARY ASSOCIATED WITH DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize the role of the decimal point in decimal numbers. (N) Before looking at the vocabulary associated with decimals, it is important to review digit places in natural numbers (whole numbers) with the help of a table (e.g. ones, tens, hundreds, thousands, tens of thousands). (See Appendix 5.) When the students clearly understand the significance of digit places in connection with whole numbers, then they are ready to study decimals. • Explain the role of the decimal point (e.g. Paul is 1.79 m tall). • Explain the parallel with fractions (e.g. 1.79 m = $1 \frac{79}{100}$ m). C² To be able to identify ones, tenths, hundredths and thousandths.	• In a number table, write numbers containing the digit 7 in different positions and ask the students to indicate the value of each digit 7. For example: 73 635: the 7 is in the position indicating tens of thousands 98 271: the 7 is in the tens position • Do a number of exercises using the number table so that the students clearly understand the significance of digit places. This is necessary before they learn to read decimals.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.32 TO USE THE VOCABULARY ASSOCIATED WITH DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C³ To be able to understand: - the value of tenths ($\frac{1}{10}$), hundredths ($\frac{1}{100}$) and thousandths ($\frac{1}{1000}$) - the connection between the number of zeroes and a digit's position after the decimal point - that as we move toward the right, the value of the digit diminishes.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.33 TO READ DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to read decimals up to the thousandths. (N) When studying decimals, point out their use in monetary values and the metric system. For example: \$3.25, three dollars and twenty-five cents 2.436 kg, two kilograms and four hundred thirty-six grams 7.312, seven and three hundred twelve thousandths 1.36 L, one litre and thirty-six millilitres The students should work regularly with decimals. In all likelihood, relating this new concept to their daily life will help them understand what they are learning. It is always better for the students to work with concrete objects before they study mathematical symbols.	• Have the students examine flyers or receipts and sort illustrations or numbers: - expressed in thousandths only - expressed in hundredths only - expressed in tenths only - greater than 1 - less than 1 - between 1 and 2 • Always have the students sort numbers related to everyday situations. For example: - receipt from a gasoline purchase - electric bill - GST and QST - telephone bill

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.33 TO READ DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES								
Flyers, receipts or labels where the students have seen decimal points used are ideal for learning to read and write decimals. For the students' needs, it is not necessary to go beyond the thousandths. Mention to the students that Bell Québec uses decimal points, whereas Hydro-Québec uses commas and that today the comma and the decimal point serve the same purpose, that is, to separate whole numbers from decimal fractions. It is essential that the students acquaint themselves with decimal points in a real-life context if they are to retain the concept.	• Have the students read the labels on packages of meat. • Have them look at the odometer of an automobile and notice the tenths of kilometres indicated on it. • Have them look at the third digit in the posted price for a litre of gasoline (56.9 cents) and then compare that price to the price on a credit card receipt (\$0.569). For example: <table><tr><td>Quantity</td><td>Price</td><td>Amount</td><td></td></tr><tr><td>31.222</td><td>0.569</td><td>17.77</td><td>Total: \$17.77</td></tr></table>	Quantity	Price	Amount		31.222	0.569	17.77	Total: \$17.77
Quantity	Price	Amount							
31.222	0.569	17.77	Total: \$17.77						

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.34 TO WRITE DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to write decimals up to thousandths with the help of a number table. (N) In a number table, have the students write decimals taken from situations they have read about. To verify if the students have clearly understood the meaning and the value of tenths, hundredths and thousandths, use numbers such as 3 tenths, 7 hundredths and 9 thousandths mixed into a dictation involving numbers.	Dictate sentences with blanks where the numbers indicating measurements should be written. For example: Peter is _____ m tall. Answer: Peter is <u>1.65</u> m tall. I bought _____ kg of ground beef. Answer: I bought <u>1.050</u> kg of ground beef.
C² To be able to write down decimals given in a dictation, without the help of the number table. (N) Go over the names and the symbols of the metric units seen in Step 2.	- Have the students replace written numbers by numerals. For example: three kilograms five hundred one metre sixty-four - Have them write sentences and questions using these concepts.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.35 TO COMPARE DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to compare decimals up to thousandths. (N) Use concrete objects (e.g. flyers, receipts) to compare amounts. Then proceed to the symbolic stage (comparing numbers only). To compare two quantities expressed differently, have the students rewrite them in the same form (the same number of decimal places). The comparison will be easier. For example: 2.499 kg and 2.5 kg 2.499 kg < 2.500 kg 5 kg and 4.999 kg 5.000 kg > 4.999 kg	• Have the students compare prices. • Have them compare different quantities by comparing different labels, such as those found on packages of meat. • Have them compare different quantities found on cash register receipts, such as weights of vegetables or of bulk items.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.35 TO COMPARE DECIMALS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C² To be able to recognize the equivalences between tenths, hundredths and thousandths. For example: $\frac{9}{10} = \frac{90}{100} = \frac{900}{1000} \text{ or } 0.9 = 0.90 = 0.900$	

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.36 TO ROUND OFF DECIMALS TO THE NEAREST WHOLE OR HALF.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Rounding off decimals and estimating values are abilities that enable people to plan purchases in terms of quantity and price. If necessary, review the concepts related to the metric system seen in Step 2. For example: kg of ground beef = 0.500 kg; therefore, 0.489 kg is close to half a kilogram. A length of 1.82 m will probably require a purchase of 2 m. C¹ To be able to round off a whole number taking into account the rules for rounding off numbers. For example: 3.2, 3 3.78, 4 0.579 kg, 1 kg \$5.25, \$5.00	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.36 TO ROUND OFF DECIMALS TO THE NEAREST WHOLE OR HALF.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES								
C² To be able to round off a whole number to estimate a price or a quantity.	Remove the price from some labels and ask the students if the total price will be less or greater than the price of a kilogram. For example: GROUND LAMB Medium POUR LE POUR LE kg 0.40 Poids Net Weight 0.350kg PRICE \$  100% DIFFERENTIATED SOURCE: 100% PURE AGNEAU HACHÉ Mi-Moelle POUR LE POUR LE PRICE \$ 								
C³ To be able to round off to the nearest half: 1.60 m is longer than one and a half metres (1.50 m). 0.540 kg is a little more than half a kilogram (0.500 kg). 1.189 kg is a little more than a kilogram (1.000 kg). 3.906 kg is almost equivalent to four kilograms (4.000 kg).	Have the students sort labels by rounding off the amounts to the nearest half kilogram. <table><tr><td>$\frac{1}{2}$ kg</td><td>1kg</td><td>$1\frac{1}{2}$ kg</td><td>2 kg</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	$\frac{1}{2}$ kg	1kg	$1\frac{1}{2}$ kg	2 kg				
$\frac{1}{2}$ kg	1kg	$1\frac{1}{2}$ kg	2 kg						

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.37 TO ARRANGE DECIMALS IN ORDER.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to arrange in order decimals with the same number of digits after the decimal point. C² To be able to arrange in order decimals with a different number of digits after the decimal point. (N) Make certain that the prerequisites of comparison and equivalence have been mastered. For example: $\frac{9}{10} = \frac{90}{100} = \frac{900}{1000} \text{ or } 0.9 = 0.90 = 0.900$ C³ To be able to arrange decimals in ascending or descending order.	- Have the students change decimals from numbers with tenths only to decimals with hundredths and thousandths. For example: $3.2 = 3.20 = 3.200$ - Have the students sort products illustrated in flyers according to quantity. - Have them sort labels according to the weight indicated.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.38 TO CHANGE A PROPER FRACTION INTO A DECIMAL, USING A CALCULATOR.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to change a number expressed as a proper fraction into a decimal. (N) This operation has already been done in connection with fractions. The use of a calculator is recommended to reduce errors to a minimum.	• Have the students change the interest rate $7\frac{3}{4}\%$ into a decimal using a calculator: $3 \div 4 = 0.75$, so $7\frac{3}{4}\%$ becomes 7.75%. • Have them change $37\frac{1}{2}$ h into a decimal using a calculator: $1 \div 2 = 0.5$, so $37\frac{1}{2}$ h becomes 37.5 h. • Have them change 2 h 40 into a decimal using a calculator: 40 minutes over 60 minutes, $40 \div 60 = 0.66$, so 2 h 40 becomes 2.66 h.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.39 TO PERFORM OPERATIONS ON DECIMALS USING A CALCULATOR.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students can learn to use a calculator for all the operations involving decimals. They should also round off the numbers to change their answers into everyday values. For example: $\\$1.09962 = \\$1.10$ $3.789 \text{ m} = 3.79 \text{ m}$ Attaining this objective will help the students act efficiently in their daily activities even if they have not learned how to perform operations with decimals. The main objective in literacy training is to help the students become autonomous as rapidly as possible. So, it is important to start by developing the ability to calculate decimals with a calculator. Afterward, students who really want to be able to calculate decimals without the help of a calculator can be taught how to do so (see Objectives 3.42 to 3.47).	• Suggest learning situations taken from everyday life: - at the delicatessen - at work - at the garage - at the bank - at the hardware store

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.39 TO PERFORM OPERATIONS ON DECIMALS USING A CALCULATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to carry out operations on decimals using a calculator. C² To be able to round off figures to the nearest hundredth.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.40 TO ESTIMATE THE RESULTS OF OPERATIONS ON DECIMALS USING A CALCULATOR.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to round off a decimal to the nearest whole number in order to have an approximate idea of the exact result of a computation. (N) To find an answer quickly, it is good for the students to be able to round numbers off to estimate their size. Verbalizing situations in class helps make the students aware of the practicality of learning to round numbers off and stimulates them to apply this learning. As a matter of fact, it is often important to <u>estimate</u> a sum, e.g. to verify if it is close to \$10 or \$20, or closer to \$40 than to \$50. When counting in certain situations, we need to make a quick estimate of the amount involved. Often, our objective is to arrive at an approximation of such things as amounts of money or quantities of merchandise.	• Present a problem such as the following: To estimate the cost of purchasing 1.32 m of ribbon at \$2.98 per metre, one can calculate $1.32 \times \\$3 = \\$3.96$.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.41 TO APPLY A PROBLEM-SOLVING APPROACH (REASONING) TO EVERYDAY SITUATIONS, USING A CALCULATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to solve problems connected with everyday situations, using: - the four operations: addition, subtraction, multiplication and division - decimals up to thousandths - one or several operations at a time (N) Having the students act out concrete situations will help them put the ideas they have learned into practice. Suggest that the students combine GST and QST and calculate using 15% (depending on the tax rates in effect). It is advisable to have several group discussions based on written problems to help the students work out strategies to solve them.	- Using a receipt, ask the students to: - find the price of each item, e.g. 0.250 kg at \$3.29 per kilogram - add up the total of the receipt - calculate the taxes (7% + 7.5%) using the decimals 0.07 and 0.075 - find the total amount due - calculate the change a customer would expect to receive from the cashier - Have the students imagine a menu for a party and then estimate its cost.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.42 TO ADD DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to add decimals containing whole numbers, tenths, hundredths and thousandths. (N) Suggest that the students be careful to align numbers that have the same place value so that they will be easier to add. Likewise, have them align the numbers carefully in relation to the whole number and the decimal point. For example: $37.2 + 7 + 11.046 = ?$ $\begin{array}{r} 37.2 \\ 7 \\ + 11.046 \\ \hline \end{array}$ becomes $\begin{array}{r} 37.200 \\ 7.000 \\ 11.046 \\ \hline 55.246 \end{array}$	• Have the students describe situations in which they have to add decimals. Create a bank of situations (e.g. groceries, sewing). • Have them write problems requiring the addition of decimals.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.43 TO SUBTRACT DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to subtract decimals containing whole numbers, tenths, hundredths and thousandths. (N) Establish the fact that \$5 and \$5.00 are the same. Likewise, if there are tenths, hundredths or thousandths in the number to be subtracted, always have the students write whole numbers followed by a decimal point and the appropriate number of zeroes. For example: 8 - 6.05 = $\begin{array}{r} 8 \\ - 6.05 \\ \hline \end{array}$ becomes - $\begin{array}{r} 8.00 \\ - 6.05 \\ \hline 1.95 \end{array}$ 3 kg - 2.765 kg = $\begin{array}{r} 3 \\ - 2.765 \\ \hline \end{array}$ becomes $\begin{array}{r} 3.000 \text{ kg} \\ - 2.765 \text{ kg} \\ \hline 0.235 \text{ kg} \end{array}$	Use any everyday situation. For example: The odometer of an automobile read 9765.4 km yesterday and reads 9869.9 km today. How far has the car travelled since yesterday?

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.44 TO MULTIPLY DECIMALS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to multiply a decimal by a natural whole number. C² To be able to multiply two decimals. (N) First, have the students multiply the numbers without taking the decimal point(s) into account. Afterwards, explain how the position of the decimal point shifts depending on the number of digits that come after it in the numbers to be multiplied.	• Use grocery store receipts. They always contain a number of calculations involving decimals. For example: 3.025 kg of meat at \$2.98 per kilogram will cost \$9.01450, but the price on the label will be \$9.01. • Erase the total on a cashier's receipt and ask the students to determine the price of each item sold by weight. Do the same with the labels on packages of meat.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.45 TO MULTIPLY A DECIMAL BY 10, 100 OR 1000, USING MENTAL CALCULATION.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES												
C¹ To be able to multiply a decimal by 10, 100 or 1000 in their head. The decimal should not go beyond the thousandths. (N) Make it very clear to the students that when they multiply numbers the answer will be a much larger number. Help them understand the connection between the number of zeroes (10, 100 or 1000) and the number of places the decimal point is shifted. <table><tr><td>10</td><td>=</td><td>1 zero</td><td>1 shift</td></tr><tr><td>100</td><td>=</td><td>2 zeroes</td><td>2 shifts</td></tr><tr><td>1000</td><td>=</td><td>3 zeroes</td><td>3 shifts</td></tr></table> For example: 3.245 m x 10 = 32.45 m 3.245 m x 100 = 324.5 m 3.245 m x 1000 = 3245 m	10	=	1 zero	1 shift	100	=	2 zeroes	2 shifts	1000	=	3 zeroes	3 shifts	• Make use of the monetary system. For instance, ask the students to break down \$3245.86 into bills of the following denominations: - How many \$10 bills can there be? - How many \$100 bills? - How many \$1000 bills? - How many \$0.10 coins can there be?
10	=	1 zero	1 shift										
100	=	2 zeroes	2 shifts										
1000	=	3 zeroes	3 shifts										

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.46 TO DIVIDE DECIMALS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) If division of decimals proves to be too complex for the students, a calculator may be used for the operation. It must be kept in mind that the primary aim of literacy training is to enable the students to use their new knowledge in everyday activities. C¹ To be able to divide a decimal by a whole number. C² To be able to divide a whole number by a decimal. C³ To be able to divide one decimal by another.	• Use everyday situations: - find the price of merchandise per kilogram - divide a quantity into 2 parts, 3 parts, etc.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.47 TO DIVIDE A DECIMAL BY 10, 100 OR 1000, USING MENTAL CALCULATION.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to divide a decimal by 10, 100 or 1000, in their head. The decimal should not go beyond the thousandths. (N) Make it very clear to the students that in dividing they will obtain a much smaller number. Help them understand the connection between the number of zeroes (10, 100 or 1000) and the number of places the decimal point is shifted. For example: $3.45 \div 10 = 0.345$ I have one zero, therefore there is a shift. $3.45 = 0.345$ In addition, a zero must be added in front of the decimal point to make it easier to read the decimal.	• Do a number of exercises on the board. • Have the students divide a list of numbers by 10, 100 or 1000 in their head. • Provide a list of purchases containing quantities of 10, 100 or 1000 units at x dollars per package. For example: If a package of 100 items costs \$39.50, what is the cost per item?

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.48 TO ESTIMATE THE RESULTS OF OPERATIONS ON DECIMALS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to round decimals off to a whole number in order to estimate the expected answer in their head. (N) See the notes for Objective A 3.40.	- Propose problems such as the following: - If 3.2 m of cloth cost \$40, what is the cost per metre? In working out the problem, the students can say $\\$40 \div 3 = \\$13.33$. So a metre costs a little less than \$13. - If the price of a kilogram of grapes is \$2.98, how much will 2.567 kg cost? $\\$3 \times 3 \text{ kg} = \\$9$. So the purchase will not cost more than \$9.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.49 TO APPLY A PROBLEM-SOLVING APPROACH (REASONING) TO EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The aim is to solve a problem using written calculations. C¹ To be able to solve problems connected with everyday situations using: - the four operations: addition, subtraction, multiplication and division - decimals up to thousandths - one or several operations at a time	See Objective A 3.41.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.50 TO RECOGNIZE THE SYMBOL FOR DEGREES CELSIUS.

NOTES (N) AND CONTENT (C)

(N) Have the students take note of the symbol used for degrees and point out its location (at the same height as an apostrophe).

C¹ 3°C means 3 degrees Celsius.

SUGGESTED ACTIVITIES

- Have the students look for temperatures given in metric units in books, newspapers and temperature tables.
- Have them watch a weather report and ask them to identify the temperatures given in metric units.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.51 TO USE INSTRUMENTS FOR MEASURING TEMPERATURE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to handle different thermometers (e.g. indoor, outdoor, clinical, meat, candy). C² To be able to observe the different thermometric scales (e.g. 1°, 2°, 5°, 10°) used on graduated thermometers. C³ To be able to observe the rise and fall of the mercury in a thermometer. (N) Explain that a hygrometer, which is used to measure humidity, is as important as a thermometer. Experiments can also be conducted with a clinical thermometer.	• Have the students conduct various experiments with an indoor thermometer: - putting their thumb over the mercury at the base of the thermometer and comparing and discussing the results obtained - putting the thermometer in ice water, then in boiling water and observing the drastic change of temperature that results • Put thermometers at various places in the classroom, e.g. near the window, in the sun, near a heat source, away from the heat. If possible, have the students take readings at different times of day and make a table of these readings.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.52 TO READ AND WRITE THE TEMPERATURE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) At this point, teachers can introduce positive and negative whole numbers. The students can learn to read temperatures below zero, such as -5°C, and to record them correctly. They can also learn to raise and lower a given temperature by several degrees. For instance, the teacher might ask how many degrees the temperature has changed from one day to the next. The students would then discuss the rising or falling temperature, the key role of 0°C and the difference between -2°C (ice) and 2°C (rain).	• Have the students read different thermometers: - first, when the temperature is above 0°C - then, when it is below 0°C - and finally, in either situation • Present drawings of thermometers and have the students colour in a given temperature.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.52 TO READ AND WRITE THE TEMPERATURE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES									
C¹ To be able to read the temperature on an indoor thermometer, an outdoor thermometer, a clinical thermometer and the thermometer on the kitchen stove. C² To be able to record a temperature read on a thermometer.	• Present a list of different temperatures (above and below 0°C): - If the temperature rises by 3°C, what will the temperature be? - If the temperature drops by 5°C, what will the temperature be? For example: <table><tr><td>current temperature</td><td>3°C rise</td><td>5°C drop</td></tr><tr><td>4°C</td><td>7°C</td><td>-1°C</td></tr><tr><td>-5°C</td><td>-2°C</td><td>-10°C</td></tr></table>	current temperature	3°C rise	5°C drop	4°C	7°C	-1°C	-5°C	-2°C	-10°C
current temperature	3°C rise	5°C drop								
4°C	7°C	-1°C								
-5°C	-2°C	-10°C								

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.53 TO INDICATE KEY POINTS ON THE TEMPERATURE SCALE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) With a few examples taken from daily life, the students can see how helpful points of reference can be in understanding the concept of temperature, e.g. normal body temperature (37°C), the freezing point of water (0°C), the ideal room temperature (20°C). Thus, in the autumn, they will recognize that the right room temperature for the house is 20°C. From points of reference, the students are better able to situate a given temperature, e.g. 3°C is close to the freezing point of water, so they can expect it to be cold. C¹ Table of essential points of reference: 30°C = hot weather (summer) 20°C = ideal room temperature 10°C = fairly chilly weather (autumn or spring) 0°C = quite cold weather (freezing point of water) -10°C = cold weather (winter) -20°C = very cold weather (winter)	• After explaining, have the students practise using reference points verbally. • Give different temperatures and ask the students to describe the climate the most closely associated with each one.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.53 TO INDICATE KEY POINTS ON THE TEMPERATURE SCALE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students may be reminded that major changes in the weather occur when the temperature rises a few degrees above or drops a few degrees below 0°C. For example: -5°C = snow and ice -1°C = icy roads and freezing rain 1°C = rain or wet snow You could have the students write the reference points down on a sheet of paper or an index card, which they could refer to until they have fully understood and assimilated this information.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.54 TO ESTIMATE THE AMBIENT TEMPERATURE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to estimate the ambient temperature by referring to the table of essential points of reference. (N) Have the students find everyday situations that are connected with a given temperature. They will then be able to reverse the procedure, that is, estimate the temperature according to other factors. See suggested activities.	• Suggest situations such as the following: - If the temperature is 10°C: • what activities can you engage in? • how are you going to dress? - If it is 30°C: • what activities can you engage in? • how are you going to dress? - How many degrees below zero does the temperature have to be for people to go skiing? - How many degrees above zero does the temperature have to be for people to go swimming in an outdoor pool?

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.55 TO READ AND WRITE METRIC UNITS OF TIME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) For the rules for writing times in the International System of Units, see Appendix 6. C¹ To be able to read and write the date using numbers or letters. C² To be able to read and write the time using numbers or letters. For example: July 8, 1947, 3:25 p.m. is written 1947-07-08-15:25. C³ To know the symbols and abbreviations related to time. year = a month = m. day = d hour = h minute = min second = s	• Relate this knowledge to everyday situations such as reading and understanding a schedule, and filling out a form.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.55 TO READ AND WRITE METRIC UNITS OF TIME.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students should know that the feature that differentiates the symbol for metre (m) from the symbol for month (m.) is the period that follows the letter m in the latter symbol.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.56 TO ESTABLISH EQUIVALENCES BETWEEN DIFFERENT UNITS OF TIME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to understand the equivalences between different units of time. $\frac{1}{2}$ hour = 30 minutes $\frac{1}{4}$ hour = 15 minutes $\frac{3}{4}$ hour = 45 minutes 1 year = 365 days 1 year = 52 weeks 1 year = 12 months 1 week = 7 days 1 day = 24 hours 1 hour = 60 minutes 1 minute = 60 seconds	• Present the students with different exercises based on the content.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.57 TO RECOGNIZE THE VOCABULARY ASSOCIATED WITH METRIC UNITS OF TIME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use the vocabulary related to the measurement of time. yearly = by the year monthly = by the month weekly = by the week daily = by the day hourly = by the hour bimonthly = twice a month semiannual = twice a year biennial = every two years	- Using short sentences, have the students state whether a salary is: - yearly - monthly - weekly - daily - hourly For example: Luc's <u>weekly</u> salary is \$450. He earns \$450 a _____ . - Conversely, give the term frequency involved and ask the students to give the proper qualifier. For example: Peter earns \$21 000 <u>a year</u>, so this is a _____ salary.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.58 TO ADD AND SUBTRACT UNITS OF TIME IN EVERYDAY SITUATIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to establish departure and arrival times in everyday situations. (N) Have the students use an analogue clock to calculate the time and a calendar to calculate dates. C² To be able to master addition and subtraction and do conversions, if necessary. (N) To do these calculations, the students might need to convert units. For example: $ \begin{array}{r} 3 \text{ h } 15 \text{ min} \\ + \quad \underline{1 \text{ h } 50 \text{ min}} \\ 4 \text{ h } 65 \text{ min} \\ + \quad \underline{1 \text{ h } -60 \text{ min}} \\ 5 \text{ h } 05 \text{ min} \end{array} $	• Have the students calculate the number of hours that a person works. • Have them calculate the time it will take to roast a given piece of meat. • Have them calculate what time a piece of meat should be put in the oven given the time it is to be ready and the time needed to roast it. • Give the students simple problems to work out, such as determining what time a family should leave their house if they have to meet someone in town at 3:00 p.m. and the trip there takes 45 minutes.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.58 TO ADD AND SUBTRACT UNITS OF TIME IN EVERYDAY SITUATIONS.

NOTES (N) AND CONTENT (C)

It is important that the problems always be related to everyday situations such as class schedules, cooking time or work schedules. The purpose of this is to help the students turn their learning into skills. Often, a concept is easier to grasp if it is related to a situation that is of significance to the students.

When doing subtraction, it is important to spend time on the concept of borrowing. If there are not enough minutes to subtract from, an hour must be borrowed, converted into 60 minutes and added to the minutes already there.

For example:

$$\begin{array}{rcl} 3 \text{ h } 45 \text{ min} & \rightarrow & 2 \text{ h } 105 \text{ min} \\ - 1 \text{ h } 50 \text{ min} & \rightarrow - & \underline{1 \text{ h } 50 \text{ min}} \\ & & 1 \text{ h } 55 \text{ min} \end{array}$$

It is the opposite procedure to that used in addition, where 60 minutes must be borrowed, converted into 1 hour and added to the hours.

SUGGESTED ACTIVITIES

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.59 TO MULTIPLY UNITS OF TIME IN EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to multiply days, hours, minutes and so on. (N) Multiplication involving time is necessary to calculate salaries. For example: Paul works 7 h 15 min a day, 5 days a week. How many hours a week does he work? $ \begin{array}{r} 7 \text{ h } 15 \\ \times \quad 5 \\ \hline 35 \text{ h } 75 \text{ min or } 36 \text{ h } 15 \text{ min} \end{array} $	Base exercises on everyday situations (e.g. at work, in the kitchen).

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.60 TO DIVIDE UNITS OF TIME IN EVERYDAY SITUATIONS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to divide days, hours, minutes and so on. (N) Division of units of time is necessary to check salaries.	Use all the situations known to the students to create a bank of problems related to the calculation of time. For example: Paul works 36 h 15 min in a 5-day week. How many hours per day does he work? $ \begin{array}{r} 7 \text{ h } 15 \text{ min} \\ 5 \overline{) 36 \text{ h } 15 \text{ min}} \\ \underline{35 \text{ h } + 60} \\ 1 \text{ h } 75 \\ \underline{-75} \\ 0 \end{array} $

STEP 3											
Knowledge should be acquired for the purpose of developing skills.											
OBJECTIVE: A 3.61 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH METRIC UNITS OF LENGTH.											
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES										
C¹ To be able to identify the symbols and vocabulary associated with metric units of length. <table> <tr> <th><u>Unit</u></th><th><u>Symbol</u></th></tr> <tr> <td>metre</td><td>m</td></tr> <tr> <td>centimetre</td><td>cm</td></tr> <tr> <td>millimetre</td><td>mm</td></tr> <tr> <td>kilometre</td><td>km</td></tr> </table> (N) In the third step, it is important to specify the rules of grammar and writing related to metric units of length (see Appendix 6). It is important that the students understand and memorize each unit, linking it to an image related to its real value. To help them, give them points of reference. The students must be able to describe a unit using an image that is clear enough for someone else to recognize its value.	<u>Unit</u>	<u>Symbol</u>	metre	m	centimetre	cm	millimetre	mm	kilometre	km	- Have the students write in words quantities given using symbols. For example: 30 km = thirty kilometres - Have them write in numbers and symbols quantities given in words. For example: forty-eight centimetres = 48 cm - Give a point of reference for each unit of length.
<u>Unit</u>	<u>Symbol</u>										
metre	m										
centimetre	cm										
millimetre	mm										
kilometre	km										

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.61 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH METRIC UNITS OF LENGTH.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C² To be able to give a point of reference for the four principal metric measurements of length. Points of reference for measurements of length 1 mm = thickness of a dime 1 cm = width of a fingernail 1 m = height of a doorknob 1 km = approximate distance covered in a 12-minute walk	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.62 TO DETERMINE THE METRIC UNIT OF LENGTH APPROPRIATE TO A GIVEN ITEM.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to determine which metric unit of length is appropriate to a given item, using points of reference. (N) If the students have clearly understood the points of reference seen in the previous objective, they will be able to tell which unit of measurement should be used in a given situation.	• Have the students determine which unit of length should be used to measure a given item. For example: - distance between Montréal and Quebec City (kilometre) - waist measurement (centimetre) - width of a ribbon (millimetre) - height of a door (metre)

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.63 TO ESTIMATE DIFFERENT LENGTHS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to estimate a measurement to within one centimetre or one metre. (N) To estimate the lengths, the students can use the points of reference to help them visualize what they are looking for.	

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.64 TO USE INSTRUMENTS FOR MEASURING LENGTH.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use a ruler and a tape measure. (N) The ruler and the tape measure are the instruments that the students will use for measuring (e.g. size of a window to buy curtains, length and width of a table to buy a table cloth). We often take for granted that the students know how to use these instruments because they know how to read the numbers on them, but this is not always the case. Measuring involves a series of complex operations. It is therefore necessary to plan several manipulation exercises with different types of instruments and to show the students where to place the base line. At first, the students should learn to measure things to within a centimetre or a metre. Next, they should be asked to take exact measurements and give exact answers, since they have already worked with decimals. You can also talk to the students about the odometer of an automobile as an instrument for measuring kilometres.	• Have the students do a number of manipulation exercises such as measuring objects or the dimensions of the class. The concepts of length, width and height can be presented during the exercises.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.64 TO USE INSTRUMENTS FOR MEASURING LENGTH.

NOTES (N) AND CONTENT (C)

C² To be able to measure to within one metre.

C³ To be able to measure to within one centimetre.

C⁴ To be able to measure in millimetres.

C⁵ To be able to measure precisely in centimetres.

C⁶ To be able to measure precisely in metres.

(N) Measuring precisely in metres or centimetres means giving an exact measurement such as 3.85 m or 5.6 cm and not rounding the number off to the nearest unit.

SUGGESTED ACTIVITIES

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.65 TO ESTABLISH EQUIVALENCES BETWEEN DIFFERENT METRIC UNITS OF LENGTH.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to establish equivalences between the four basic metric units of length. 1 m = 100 cm 1 m = 1000 mm 1 km = 1000 m 1 cm = 10 mm (N) The students will learn to establish equivalences between different metric units of length by changing a measurement given in centimetres into one expressed in millimetres, etc. C² To be able to convert a given value from one unit of measurement to another. For example: 12 mm = 1.2 cm 241 cm = 2.41 m	• Have the students measure each other, give their height in metres and centimetres and compare their results with the information on their driver's licences. • Have them stand in order of height, their backs to the wall. • Have them fill out a data sheet on their measurements: For example: - arm length - neck size - waist size - hip size - inseam

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.66 TO PERFORM THE FOUR BASIC OPERATIONS (+, -, x, ÷) ON METRIC UNITS OF LENGTH.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students will improve their ability to calculate values in the metric system. C¹ To be able to calculate given values and convert them, if necessary. (N) It is important to explain the various ways of calculating measurements according to the learning pace of the class. The students could also do their calculations using a calculator and do the necessary conversions before or after their calculations.	• Work with situations that are familiar to the students. For example: - Calculate the length of a board to be purchased to make 3 shelves 65 cm in length. $\begin{array}{r} 65 \text{ cm} \\ \times \quad 3 \\ \hline 195 \text{ cm} \end{array}$ Answer: 195 cm or 1.95 m

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.66 TO PERFORM THE FOUR BASIC OPERATIONS (+, -, x, ÷) ON METRIC UNITS OF LENGTH.

NOTES (N) AND CONTENT (C)

SUGGESTED ACTIVITIES

- Cut a 3-m length in 5 parts.

$$3 \text{ m} = 300 \text{ cm}$$

$$5 \overline{) 300 \text{ cm}}$$

or

$$5 \overline{) 3.0 \text{ m}}$$

Answer: 60 cm or 0.60 m

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.67 TO APPLY ACQUIRED KNOWLEDGE TO PROBLEMS INVOLVING METRIC UNITS OF LENGTH IN EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use the concepts studied since Objective A 3.61 to solve one or more problems. (N) Ask the students to list situations in which they need to apply this knowledge. Have them invent and solve problems based on these situations. Create a bank of different situations. This way, the students will have something to refer to when a situation arises in everyday life. If they forget how to deal with a problem, the bank will be available to help them solve it.	Have the students do exercises based on situations that arise while they are engaged in everyday activities such as sewing, carpentry or renovation work.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.68 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH METRIC UNITS OF LIQUID VOLUME.

NOTES (N) AND CONTENT (C)

C¹ To be able to identify the symbols and vocabulary associated with metric units of liquid volume.

<u>Unit</u>	<u>Symbol</u>
litre	L
millilitre	mL

(N) The students should become familiar with the most common units of volume: the litre (L) and the millilitre (mL). Like metric units of length, units of volume must be associated with everyday activities. To help the students understand, you can associate the litre with a carton of milk, and the millilitre with approximately 20 drops of water. It is also important to have the students observe objects around them: soft drink bottles, ice cream containers, perfume bottles, etc. Observing the contents of their kitchen cabinets or flyers in market brochures helps the students recognize the various units of measurement and relate them to one another.

SUGGESTED ACTIVITIES

- Have the students read grocery store or drug store flyers and pick out products that are measured in metric units of liquid volume.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.68 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH METRIC UNITS OF LIQUID VOLUME.

NOTES (N) AND CONTENT (C)

C² To be able to give a point of reference for the principal metric units of liquid volume.

Points of reference for measurements of volume

1 mL = about 20 drops of water

5 mL = 1 teaspoon

15 mL = 1 tablespoon or 1 small container of coffee cream

250 mL = 1 cup

750 mL = 1 regular soft drink bottle

1 L = 4 cups or a carton of milk

2 L = ice cream container or large soft drink bottle

SUGGESTED ACTIVITIES

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.69 TO DETERMINE THE METRIC UNIT OF LIQUID VOLUME APPROPRIATE TO A GIVEN ITEM.

NOTES (N) AND CONTENT (C)

C¹ To be able to determine which metric unit of liquid volume is appropriate to a given item, using points of reference.

For example:

- a cup of coffee or bottle of perfume (millilitre)
- ice cream or gasoline (litre)

SUGGESTED ACTIVITIES

- Have the students determine which unit of volume applies to each item on a list. Then have them go through flyers and kitchen cabinets to verify which units are used in everyday life.
- Have them identify items sold by the millilitre.
- Have them identify items sold by the litre.
- Have them identify items measuring approximately $\frac{1}{2}$ litre.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.70 TO ESTIMATE A QUANTITY IN METRIC UNITS OF LIQUID VOLUME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students must learn that a cup is equivalent to 250 mL and that a litre is equivalent to 4 cups, since $4 \times 250 \text{ mL} = 1000 \text{ mL}$. In their environment, the students must be able to recognize the units used to measure the quantity contained in a given volume. C¹ To be able to estimate a quantity to within 1 L. C² To be able to estimate a quantity to within 500 mL. C³ To be able to estimate a quantity to within 250 mL.	• Have the students estimate the contents of certain items in metric units of liquid volume, stating whether they are closer to 250 mL, 500 mL or 1 L.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.71 TO USE INSTRUMENTS FOR MEASURING LIQUID VOLUME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to measure a quantity in litres. C² To be able to measure a quantity in millilitres. C³ To be able to read a given quantity. (N) The students will need to learn how to use a measuring cup and measuring spoons to measure liquid volume. Since most measuring cups feature both metric and imperial units, it is easy to establish equivalences (250 mL = 1 cup, 125 mL = $\frac{1}{2}$ cup). Have the students read and make various recipes. The same applies to measuring spoons. If the measuring spoons do not indicate measures in metric and imperial units, have the students write the equivalences down on an index card for easy reference.	• Have the students measure a number of different quantities using measuring cups and spoons. • Have them read various measurements in drawings. • Have them complete drawings with the help of measuring cups so as to give the quantity asked for. • Have them measure quantities for a recipe.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.72 TO ESTABLISH EQUIVALENCES BETWEEN DIFFERENT METRIC UNITS OF LIQUID VOLUME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to establish equivalences between metric units of liquid volume. 1 L = 1000 mL $\frac{1}{2}$ L = 500 mL $\frac{1}{4}$ L = 250 mL 1 L = 4 cups 1 cup = 250 mL (N) The students must learn to establish equivalences between different metric units of volume by converting a value given in litres into a volume expressed in millilitres, etc. C² To be able to convert a given value from one unit of measurement to another.	- Have the students examine flyers and find products sold by the litre, the quarter litre and the half litre. - Have the students find equivalences. For example: 1 cup = _____ mL 2 cups = _____ mL 3 cups = _____ mL 4 cups = _____ mL or _____ L 5 cups = _____ mL or _____ L 1.5 L = _____ mL - Have the students complete a conversion table for litres and millilitres. For example: 1.360 L = _____ mL _____ L = 250 mL

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.73 TO PERFORM THE FOUR BASIC OPERATIONS (+, -, x, ÷) ON METRIC UNITS OF LIQUID VOLUME.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to calculate given values and convert them, if necessary. (N) Before performing the operations, you must ensure that the quantities are in the same unit of measurement. It is important to explain the different ways of calculating measurements according to the learning pace of the class. The students can also calculate using a calculator and do the necessary conversions before or after their calculations.	• Work with everyday situations. For example: - Add two leftover quantities: $796 \text{ mL} + 354 \text{ mL} = 1150 \text{ mL}$ or 1.150 L - Subtract a quantity that has been used: $1 \text{ L} - 450 \text{ mL} = 1000 \text{ mL} - 450 \text{ mL} = 550 \text{ mL}$ - Multiply to find content: $450 \text{ mL} \times 5 = 2250 \text{ mL}$ or 2.250 L - Divide a quantity into 5 parts: $3 \text{ L} \div 5 = 3000 \text{ mL} \div 5 = 600 \text{ mL}$

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.74 TO APPLY ACQUIRED KNOWLEDGE TO PROBLEMS INVOLVING METRIC UNITS OF LIQUID VOLUME IN EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use the concepts studied since Objective A 3.68 to solve one or more problems.	• Have the students work as a group to list situations in which they need to apply this knowledge. Have them invent and solve problems based on these situations. • Propose exercises and situations based on themes such as: - recipes - purchasing gasoline - buying items at a grocery store - mixing liquids (dyes, cleaners) - paint

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.75 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH METRIC UNITS OF WEIGHT.

NOTES (N) AND CONTENT (C)

C¹ To be able to identify the symbols and vocabulary related to metric units of weight.

Unit

Symbol

kilogram

kg

gram

g

milligram

mg

C² To be able to use points of reference for the main metric units of weight.

Points of reference for measurements of weight

1 kg = a box of salt

500 g = a box of cornstarch or a package of 16 or 24 slices of cheese

250 g = a package of 8 or 12 slices of cheese

100 g = a D battery or 25 quarters

1 g = a cigarette

SUGGESTED ACTIVITIES

- Bring various objects to class and have the students check the units of measurement associated with them.

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.75 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH METRIC UNITS OF WEIGHT.

NOTES (N) AND CONTENT (C)

(N) As mentioned earlier, it is important to give the students reference points they can use as mental images (e.g. 1 kg = a box of salt, 1 g = the weight of a cigarette, 1 mg = a measurement for medication). Ask the students to examine objects in their surroundings (e.g. a bag of chips, a stick of butter, a yogurt container). You can then point out that some foods are measured according to their volume and others according to their weight (e.g. frozen yogurt is measured in litres and regular yogurt in grams).

SUGGESTED ACTIVITIES

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.76 TO DETERMINE THE METRIC UNIT OF WEIGHT APPROPRIATE TO A GIVEN ITEM.

NOTES (N) AND CONTENT (C)

C¹ To be able to determine which metric unit of weight is appropriate to a given item, using points of reference.

SUGGESTED ACTIVITIES

- Have the students determine if products are measured in kilograms, grams or milligrams.

For example:

- a bag of apples (kilograms)
- a piece of cheese (grams)
- a pill (milligrams)

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.77 TO ESTIMATE WEIGHT IN METRIC UNITS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to estimate the weight of given objects in kilograms. C² To be able to estimate the weight of given objects in grams. C³ To be able to determine when a weight should be measured in milligrams.	Have the students estimate the weight of objects with the help of points of reference.

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.78 TO USE INSTRUMENTS FOR MEASURING WEIGHT.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to read a weight recorded on a bathroom scale. C² To be able to read a weight recorded on a kitchen scale. C³ To be able to read a weight recorded on a grocery store scale. (N) Bathroom and kitchen scales should be brought to class if possible so that the students can learn to use them. They could also read the weights indicated on illustrated scales. C⁴ To be able to estimate the price of certain food items by reading how much they weigh on a grocery store scale.	- Have the students observe a kitchen scale and explain the different divisions. Compare different types of scales. - Have them look at the scale used to weigh fruits and vegetables in a grocery store. - Have them weigh different quantities of merchandise. - Have them verify the approximate cost of an item. At the grocery store: If tomatoes cost \$5.98/kg and 3 tomatoes weigh 0.658 kg, will the price be more than \$3?

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.78 TO USE INSTRUMENTS FOR MEASURING WEIGHT.

NOTES (N) AND CONTENT (C)

(N) The teacher should point out to the students that in winter the price of food often rises and buyers who do not pay attention to the price of their purchases can have a shock when the cashier totals up the cost. It is also important to check whether an item is priced by the pound or by the kilogram.

SUGGESTED ACTIVITIES

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.79 TO ESTABLISH EQUIVALENCES BETWEEN METRIC UNITS OF WEIGHT.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to establish equivalences between metric units of weight. 1 kg = 1000 g 1 g = 1000 mg (N) The students should be able to understand, interpret and check what is written on labels on packages of meat and other products. For instance, they should understand that when they ask for 300 g of meat, the label will indicate 0.300 kg. They should be aware that the weight of something sold by the kilogram in a grocery store is written with 3 digits after the decimal point, whereas the weight of something produced in a factory, such as laundry soap, might be written with only 1 or 2 digits after the decimal point (e.g. 2.6 kg).	- Have the students give the weight of a product in a unit other than the one on the label. For example: 3.245 kg = 3245 g 0.649 kg = 649 g 715 g = 0.715 kg - Have them complete a conversion table for kilograms and grams. For example: 3.250 kg = _____ g _____ kg = 258 g

STEP 3

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 3.80 TO PERFORM THE FOUR BASIC OPERATIONS (+, -, x, ÷) ON METRIC UNITS OF WEIGHT.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to calculate given values and convert them, if necessary. (N) See what was presented in Objective A 3.73 and change into kilograms and grams.	Have the students find the price of a product on a receipt from a grocery store or a hardware store. For example: 800 g at \$2.98/kg = 0.800 kg x \$2.98 = \$2.384 Price: \$2.39

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.81 TO APPLY ACQUIRED KNOWLEDGE TO PROBLEMS INVOLVING METRIC UNITS OF WEIGHT IN EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use the concepts studied since Objective A 3.75 to solve one or more problems.	• In class, have the students list situations where they need to apply this knowledge. Have them invent and solve problems based on these situations. • Propose exercises and situations based on such themes as: - objects in the kitchen - purchases at the market - purchases at the hardware store

STEP 3	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 3.82 TO SOLVE PROBLEMS INVOLVING METRIC UNITS, USING A CALCULATOR.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to add, subtract, multiply and divide metric units of length, volume and weight. (N) Certain students have difficulty calculating accurately, especially when the calculations involve decimals. A calculator can help them solve this problem. Do not forget to have the students do conversions before or after their calculations, when necessary.	• Use learning situations seen in the previous objectives and have the students use a calculator.

STEP 4

INTRODUCTION

In the fourth step, the students will expand their knowledge of the concept of percentage. They will also become familiar with the rule of three and geometry.

Learning about percentages will require quite a bit of time, because it is one of the most frequently encountered mathematical concepts in everyday life. Practically everything is subject to the GST (Goods and Services Tax) and the QST (Québec Sales Tax). Percentages have to be reckoned with every day, so knowing what “percentage” represents will help the students understand and foresee its effect on their budgets.

Learning the rule of three will help the students solve different problems. The students will work primarily with the simple rule of three, but it might also be possible to familiarize them with the inverse rule of three.

Learning geometry will help the students solve elementary problems related to everyday life, such as changing a window frame or laying a new carpet. The focus will be on concrete examples. In the beginning there will be no attempt to have the students use formulas. Instead, the goal is to have them understand the nature of things like perimeter, area, volume, squares, rectangles and triangles. Since circles and discs are more difficult to understand, only basic elements of these geometric figures will be studied.

In fact, throughout this program, attention will be focused on problems that are likely to arise in the daily lives of students enrolled in customized literacy training. Certain special problems may be discussed, but the objectives to be attained must remain elementary and realistic. Indeed, why take the risk of putting the students in situations that will only cause them frustration? It is much better to build up their confidence by answering their true needs. Hence, certain geometric concepts will not be studied. Students who wish to expand their knowledge can do so in the presecondary and secondary programs.

Also, it is recommended that the students use a calculator, since they may forget a technique they have learned (e.g. the division of decimals). Initially, it is therefore essential that the students learn to do all their calculations with a calculator and that its use be emphasized. Once the concepts have been understood and the skill of using a calculator acquired, the students can learn to calculate on paper. The latter skill becomes an extra because in customized literacy training, priority is given to understanding. The students should by no means get lost in their calculations and forget what they are doing. They have a tendency to place value on acquiring techniques without really understanding what they are doing. To ensure that

students can **generalize** what they are learning, it is important that they be able to verbalize what they are doing and that they be able to name each one of the steps they use to achieve a certain result and that they always be able to identify in words what the numbers they use represent. That is why the use of verbal modelling is a very effective approach for helping the students understand the procedures they must use. The teacher should describe everything he or she does, naming each step in the problem-solving process or technique being used. He or she must think aloud so that the students can better understand what has to be done.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.01 TO RECOGNIZE THE PERCENT SIGN.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize the percent sign. (N) Areas where percentages are used: • goods and services - taxes (GST, QST) - sales, price discounts • the workplace - commissions - raises - indexing of salaries - salary cuts - deductions for dues or premiums - taxes • financial institutions - loans - investments - interest rates	• Have the students spot the percent sign in flyers or newspapers or on receipts. • Have them spot the percent sign (%) in a series of symbols. • Have them point out the percentage key on a calculator.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.02 TO DEFINE “PERCENTAGE.”	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students should be familiar with the concept of percentage: a rate that can be converted into a ratio whose denominator is 100. The whole is $\frac{100}{100}$ or 100%. C¹ To be able to work with whole numbers in the beginning (e.g. 7% and not $7\frac{1}{2}\%$). C² To be able to find equivalences between percentages, fractions and decimals.	Give the students different percentages and have them find the equivalent fractions whose denominator will be 100 and the equivalent decimals in hundredths. For example: $8\% = \frac{8}{100} = 0.08$

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.02 TO DEFINE “PERCENTAGE.”	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C³ To be able to recognize when percentages are used in everyday situations. For example: • extra costs (e.g. taxes, credit) • lower cost (e.g. discounts, bargains) • income (e.g. investments, commissions) • interest as a penalty • interest (e.g. credit cards)	• Using everyday situations, have the students classify percentages according to whether they mean more or less money. • Have the students recount personal experiences and discuss various situations related to percentages, in order that they may realize the importance of the concept in their daily lives.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.03 TO USE THE VOCABULARY ASSOCIATED WITH PERCENTAGE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Since a percentage can be a sum to pay or to receive, it is important to use the related vocabulary as frequently as possible. It is also essential that a bank of situations involving percentages be constituted and that the students understand how percentage applies to these situations. It is important to emphasize that an interest rate is always for a period of one year but that the term of the loan or investment can vary.	

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.03 TO USE THE VOCABULARY ASSOCIATED WITH PERCENTAGE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use the vocabulary associated with percentage. • interest rate • GST, QST • commission • rate of increase • discount • rate of indexation • loan rate • monthly payment • tax rate • income tax rate • credit rate • capital, interest	• Have the students create a bank of learning situations and classify each one according to the way percentage is used. For example: - an additional amount to pay - less to pay - an amount received - an amount paid • Have the students single out the percentage on various documents and determine what it means. For example: - telephone bill - electric bill - department store bill - advertisement for a financial institution - sales contract

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.03 TO USE THE VOCABULARY ASSOCIATED WITH PERCENTAGE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	- Have the students verify whether a given percentage makes sense. For example: I obtained a 100% discount. - Have the students read a table giving information on loan rates, such as the variations in monthly payments according to the term of the loan, the amount borrowed and the current interest rate.

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.04 TO CALCULATE PERCENTAGES.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) At first, the students should work with calculators. For example: $\$120 \times 7\% = \$14$ To use the calculator, it is necessary to review rounding off to the second decimal place. In general, the rule for rounding off is the following: if the digit in the third decimal place is 5 or greater, a cent is added to the amount. To make this easy at first, give the students something simple to do: adding the GST and the QST and rounding off to the nearest whole number to calculate the approximate tax. For example: GST: 7% + QST: 7.5% Total taxes: 15.025% Find the approximate amount by multiplying by 15%.	• Present the students with bills on which the GST and the QST have been calculated on all the items and have them check the amount of the taxes using a calculator. • Have the students calculate given percentages in various situations that they have seen before, using a calculator. • Have them make a shopping list using catalogues and flyers. Have them calculate the cost of their purchases, then the taxes (GST and QST with percentage rounded off) and finally the overall total. • Give the students different percentages and have them do precise calculations. • Have them calculate discounts. • Have them calculate commissions. • Have them calculate salary increases.

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.04 TO CALCULATE PERCENTAGES.

NOTES (N) AND CONTENT (C)

When the students have mastered the combined taxes with the calculator, you can then have them calculate the taxes separately, that is, the GST and then the QST.

Then, if the students have mastered calculating percentages with a calculator, they can begin to do written calculations.

It is recommended that you work with decimals.

For example:

8% of \$250
becomes $\$250 \times 0.08 = \$20$

C¹ To be able to calculate percentages using a calculator.

C² To be able to calculate percentages in everyday situations.

SUGGESTED ACTIVITIES

- Have them calculate income tax.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.04 TO CALCULATE PERCENTAGES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C³ To be able to calculate percentages involving a fraction ($7\frac{1}{2}\%$). Convert a fraction into a decimal and then do the calculations. (N) In this way, the students will be able to calculate a percentage in the way that suits them best. If they are unable to do written calculations, they can use a calculator. The main objective is to understand percentages in everyday life and to work with them effectively.	• Have them calculate the QST (7.5%) on various items. • Have them calculate interest when the rates include fractions.

STEP 4																				
Knowledge should be acquired for the purpose of developing skills.																				
OBJECTIVE: A 4.05 TO ESTIMATE THE RESULT OF AN OPERATION INVOLVING A PERCENTAGE.																				
NOTES (N) AND CONTENT (C)		SUGGESTED ACTIVITIES																		
C¹ To be able to estimate the quantity corresponding to a given percentage in an everyday situation. (N) The students should be able to estimate the answer. This will require a review of the rules for rounding off and for doing mental arithmetic involving 10, 100 and 1000. It is important to work on this objective in a group to help the students understand and learn to quickly identify errors in their calculations (such as a decimal point in the wrong place) or to quickly arrive at approximate answers. Of course, it will be necessary to work on this objective again in problem solving. Example A: If you know that 10% of \$300 = \$30, it is easy to calculate what 30%, 40% or 70% of \$300 will be.		- Have the students quickly estimate a discount, taxes, or an interest charge. - Have them calculate what remains to be paid after a given discount. <table><tr><th>Indicated Price</th><th>Discount</th><th>% to Be Paid</th><th>Net Price</th></tr><tr><td>\$40</td><td>10%</td><td>90%</td><td>\$36</td></tr><tr><td>\$75</td><td>20%</td><td>80%</td><td>\$60</td></tr><tr><td>\$80</td><td>30%</td><td>70%</td><td>\$56</td></tr></table>			Indicated Price	Discount	% to Be Paid	Net Price	\$40	10%	90%	\$36	\$75	20%	80%	\$60	\$80	30%	70%	\$56
Indicated Price	Discount	% to Be Paid	Net Price																	
\$40	10%	90%	\$36																	
\$75	20%	80%	\$60																	
\$80	30%	70%	\$56																	

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.05 TO ESTIMATE THE RESULT OF AN OPERATION INVOLVING A PERCENTAGE.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES										
If $30\% = 3 \times 10\%$, $40\% = 4 \times 10\%$ and $70\% = 7 \times 10\%$, the answer can be quickly found by finding the value of 10%, then multiplying that value by 3, 4 and 7, respectively. If 10% of \$300 = \$30, 30% of \$300 will be $3 \times \\$30 = \\$90$; 40% of \$300 will be $4 \times \\$30 = \\$120$; 70% of \$300 will be $7 \times \\$30 = \\$210$. Example B: If a flyer advertises a discount of 8% on a \$400 piece of furniture, what is the amount of the discount? \$3200, \$320, \$32, \$3.20 Round off to 10% and calculate 10% of \$400 = \$40; thus, the answer should be close to \$40, that is, \$32.	<table><tr><th>Indicated Price</th><th>Rounded-off Price</th><th>Discount</th><th>% to Be Paid</th><th>Net Price</th></tr><tr><td>\$28.98</td><td>\$30</td><td>30%</td><td>70%</td><td>\$21</td></tr></table> - Propose problems and have the students identify the correct answer by estimating and using their judgement. - Have the students use mental arithmetic to calculate how much to leave as a tip in a restaurant.	Indicated Price	Rounded-off Price	Discount	% to Be Paid	Net Price	\$28.98	\$30	30%	70%	\$21
Indicated Price	Rounded-off Price	Discount	% to Be Paid	Net Price							
\$28.98	\$30	30%	70%	\$21							

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.05 TO ESTIMATE THE RESULT OF AN OPERATION INVOLVING A PERCENTAGE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
Example C: If 15% is equal to 10% + 5%, then a 15% tip on a \$30 meal should be calculated as follows: • 10% of \$30 is \$3 • 5% is half of 10%, and $\frac{1}{2}$ of \$3 is \$1.50 • so the tip will be $\\$3 + \\$1.50 = \\$4.50$	

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.06 TO APPLY A PROBLEM-SOLVING APPROACH TO EVERYDAY SITUATIONS INVOLVING PERCENTAGES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) It is really with this objective that students start applying the knowledge they have learned. They should therefore be allowed to broaden that knowledge. The students very quickly forget knowledge that they do not apply. Since calculating percentages is an everyday occurrence because of the GST and QST, it is essential that the students become competent in this area. C¹ To be able to apply a problem-solving approach to everyday situations. percentages and consumption For example: GST, QST, rebates, discounts, increase in the cost of living	Using specific themes, have the students do a series of problems in writing and then verify their results using a calculator.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.06 TO APPLY A PROBLEM-SOLVING APPROACH TO EVERYDAY SITUATIONS INVOLVING PERCENTAGES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
- percentages and financial institutions For example: loans, interest income, loan charges, credit cards, interest rates, service charges - percentages and the workplace For example: salary indexation, commissions, deductions at source, salary increases	

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.07 TO BE FAMILIAR WITH THE RULE OF THREE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The objective is to explain the rule of three and when it applies. The students must understand that the rule of three is more a technique for finding answers than a concept. To teach the rule of three, it is important to use whole numbers that will produce whole numbers in the students' calculations. Otherwise, the students easily get confused working with decimals; they forget what they are working on and concentrate too much on their calculations. The students may also use a calculator. This way they are able to think about the problem rather than trying to memorize a calculating technique. C¹ To be able to explain the rule of three.	• Describe situations that involve using the rule of three. • Have the students recognize the three main elements in the rule of three. For example: - Peter covered <u>180 km</u> in <u>2 hours</u>. He still has <u>360 km</u> to travel. How much longer will it take him to reach his destination? - Louise earned <u>\$320</u> for <u>40 hours</u> work. How much will she earn for <u>45 hours</u> work?

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.08 TO KNOW WHEN AND HOW TO USE THE RULE OF THREE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to show when to use the rule of three. (N) No doubt the students will notice that they have already used the rule of three without realizing it. All they need to learn is how to use it to solve seemingly difficult problems. C² To be able to explain how to use the rule of three. (N) It is by working in a group that the students will grasp the procedure to follow. It is essential that they understand why it is important to find the value of <u>one unit</u>. The verbal modelling approach is very effective here. At the board, the students demonstrate all the operations, explain the procedure to follow and answer the questions connected with the problem-solving approach. In this way, the students understand what is happening and then try to explain the procedure to someone else. It is advisable to divide the students into small groups next, so as to allow them to work on this concept by discussing it and exchanging ideas.	- Present the students with easy problems that enable them to use the rule of three in everyday situations. For example: grocery store: kilograms and money workplace: hours of work and salary, hourly wage automobile: kilometres per hour, litres per 100 km - Give the students various problems and ask them to judge whether or not the rule of three can be used to solve them. For example: - I bought a bag of cookies for \$3.49 and a roast beef for \$8.92. If I pay with a \$20 bill, how much change will I get back? - I bought 1.200 kg of ground beef for \$5.99 per kilogram. How much will a package of ground beef weighing 2.450 kg cost?

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.08 TO KNOW WHEN AND HOW TO USE THE RULE OF THREE.

NOTES (N) AND CONTENT (C)

For example:

Last month, I paid \$10.47 for 3 m of fabric to make a cushion. Today, I want to make a bigger cushion. I estimate that I will need 5 m of fabric, and I want to know how much it will cost.

Propose the following procedure:

- Underline the three known quantities.
- Understand the question and state what you are looking for.
- Make a table divided into three columns:
 - data
 - solution
 - calculations

SUGGESTED ACTIVITIES

- Do a number of demonstrations at the board or in the students' notebooks.
- Have the students do a number of problems on a particular theme (e.g. kilograms and money).
- Also use grams and litres.

STEP 4		
Knowledge should be acquired for the purpose of developing skills.		
OBJECTIVE: A 4.08 TO KNOW WHEN AND HOW TO USE THE RULE OF THREE.		
NOTES (N) AND CONTENT (C)		SUGGESTED ACTIVITIES
Data If 3 m = \$10.47 then 1 m = \$? If 1 m = \$3.49 then 5 m = \$?	Solutions 1 m = 3 times less 5 m = 5 times more Answer: \$17.45	Calculations (calculator) $\\$10.47 \div 3 = \\$3.49$ $5 \times \\$3.49 = \\$17.45$
It is essential that the students ask themselves the following question: "Will one unit mean more or less?" This question determines the type of operation required (multiplication or division). They will then also be able to reason when they encounter the inverse rule of three. The teacher should urge the students to work with a table of data, solutions and calculations, to help them organize their thoughts and use an effective procedure when applying the rule of three.		- Give the students problems involving the simple and the inverse rule of three. For example: - If 3 employees took 10 hours to do a given job, how many hours will 5 employees take? - If it takes me 5 hours to reach my destination at 90 km/h, how much time would the trip take if I travelled at 100 km/h?

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.09 TO ESTIMATE THE RESULT OF A PROBLEM SOLVED USING THE RULE OF THREE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students could round the quantities off to estimate the result. It is obvious that the quantity will be quite large. In addition, the students could think about whether the answer should be greater or less than the data they already have. For example: Paul earned \$68.90 for 13 hours of work. How much will he earn working a 40-hour week? If 13 h = \$68.90 then 13 h = approximately \$70 then in 1 h, Paul will earn between \$5 and \$6 and in 40 h he will earn between \$200 and \$240 C¹ To be able to estimate the result of a problem solved using the rule of three.	• Have the students do the problems in three steps. - Work out an approximation of the expected answer. - Calculate the exact answer. - Compare the anticipated answer and the exact answer. • Show the advantages of arriving at an approximate answer before calculating the exact answer, then have the students do problems using mental arithmetic to arrive at an approximate answer.

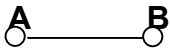
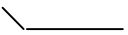
STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.10 TO APPLY A PROBLEM-SOLVING APPROACH USING THE RULE OF THREE IN EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to apply the simple rule of three. C² To be able to apply the inverse rule of three. (N) The rule of three is a problem-solving process. Present a variety of problems derived from everyday situations. The students should be able to recognize when the rule of three is relevant and be able to use it to solve problems. When the students do the same types of problems over and over, they are better able to understand the operations involved. For this learning to stay with them, the rule of three must become second nature. They must be able to work with it automatically without having to think about it; the technique should become easy and natural.	• Have the students do problems related to renovating a kitchen. • Have them do problems related to the family budget. • Have them do role playing involving the simple and the inverse rule of three. Modify the data but keep the same scenario. For example: Employer: - An employee earns \$273 per week for 35 hours of work. If last week he worked 42 hours, how much do I owe him? - If 6 employees were able to finish a job in 3 days, how many employees would I need to do the same job in 2 days?

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.10 TO APPLY A PROBLEM-SOLVING APPROACH USING THE RULE OF THREE IN EVERYDAY SITUATIONS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	Truck driver: - If I travelled 450 km in 5 hours today, what distance can I cover tomorrow if I travel at the same speed as today for 7 hours? - If I drove at 90 km/h for 5 hours today, how long will it take me to cover the same distance tomorrow if I increase my speed to 100 km/h?

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.11 TO RECOGNIZE CERTAIN GEOMETRIC FIGURES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize a square, a rectangle, a triangle and a circle in everyday situations. (N) Help the students recognize these figures in everyday situations. You can also ask them to find the differences between the figures and describe them.	• Ask the students if they can recognize the different figures (circle, square, rectangle and triangle) in a drawing, an object or a room (e.g. table, window, tile, plate). • Have them identify the following figures in the facade of a house: - squares - rectangles - triangles - circles • Have them name a given figure. • Have them draw a given figure.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.12 TO MEASURE STRAIGHT LINES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize a straight line. C² To be able to measure straight lines: • to the nearest centimetre • to the nearest metre C³ To be able to accurately measure lengths or straight lines in metres, centimetres and millimetres. (N) The object is to make the students realize what a straight line is by asking them to recognize lines of different lengths in the classroom or on their desks (e.g. length of the board, height of a window, width of a desk).	• Have the students find different objects in the classroom that have straight lines. • Have them find short segments in a long straight line. For example: A B C D E F G  $\overline{AB}$, $\overline{BC}$, $\overline{AC}$ etc. • Have them measure different lengths such as that of a classroom, an office, a window or a pencil. • Have them measure short and long objects.

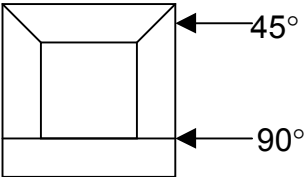
STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.12 TO MEASURE STRAIGHT LINES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
In the third step the students learned to measure in millimetres, centimetres and metres. Nevertheless, it would be a good idea to verify whether they have retained what they learned by asking them first to give the measurement to the nearest metre and the nearest centimetre. The students should then give the exact measurement with a decimal (e.g. 13.04 m, 12.7 cm).	

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.13 TO RECOGNIZE CERTAIN SYMBOLS AND VOCABULARY ASSOCIATED WITH GEOMETRY.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use the symbols and vocabulary connected with geometry. - length l - width w - height h - base b - metre m - centimetre cm - millimetre mm - kilometre km - angle $\angle$ - measurement of angle A $m \angle A = \text{_____}^\circ$ - segment AB AB - measurement of segment AB $m AB \text{_____}$ - segments indicated by points and capital letters  - right angle L - acute angle $<$ - obtuse angle  - radius r	- Using figures on which <u>measurements are given</u>, have the students determine the length, height or width. For example: - Always use everyday situations to enable the students to recognize the concepts being studied. - intersection of two streets (perpendicular) - quadrilaterals (right angles) - angles in a house

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.13 TO RECOGNIZE CERTAIN SYMBOLS AND VOCABULARY ASSOCIATED WITH GEOMETRY.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
- diameter d - parallel $\parallel$ - perpendicular $\perp$ (N) Go over the metric measurements of length studied in the second and third steps. The students should recognize that segments meet, that they form angles and that the angles are measured in degrees. Their attention should also be called to the fact that the same symbol and word are used in two different contexts: $30^{\circ}\text{C} = 30$ degrees Celsius in meteorology and $< 30^{\circ} =$ a 30-degree angle in geometry. You can familiarize the students with the different types of angles: right, acute and obtuse. Right angles are particularly important. C² To be able to recognize the symbols for measuring inches and feet. inches (") feet (')	- Using figures <u>on which measurements are given</u>, have the students identify the measurement of angle A. - Have the students recognize the angles contained in a given figure. - Have the students bring to class flyers and catalogues in which the symbols being studied are used.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.13 TO RECOGNIZE CERTAIN SYMBOLS AND VOCABULARY ASSOCIATED WITH GEOMETRY.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Although Canada has officially adopted the metric system, some stores specializing in construction materials still measure their products in inches and feet. C³ To be able to read measurements in inches and feet.	• Have the students read and explain measurements. For example: - marquetry: 12" x 12" - plywood: 4' x 8' - spruce: 2" x 3" x 8' - prefabricated door: $\frac{3}{8}$" thick, 24", 28", 30" or 32"

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.14 TO USE MEASURING INSTRUMENTS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to use measuring instruments: - square - protractor - compass (N) The object is first to see how a square makes it possible to measure off a perfect corner, that is, a right angle; then how one can use a protractor to measure angles (e.g. a 45° corner of a window frame); and finally, how one can draw circles using a compass. Measuring with a ruler and a tape measure has already been studied in the third step. A brief review is sufficient.	• Have the students do as many manipulation exercises as possible with each of the instruments. • Have them check window and door frames, or the angle of walls with a square. • Have them measure angles, giving the measurement in degrees. • Have them measure objects using the symbols they know.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVES: A 4.15 TO MEASURE ANGLES. A 4.16 TO CONSTRUCT ANGLES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to measure 30°, 45°, 60° or 90° angles. C² To be able to construct 30°, 45°, 60° or 90° angles. For example: - Mouldings along the walls of a living room must be cut at a 45° angle at the corners. - Installing a window requires cutting the upper part of the frame at a 45° angle.	- Have the students draw a window frame indicating the angles. For example:  - Have them measure the given angles. - Have them construct the given angles.

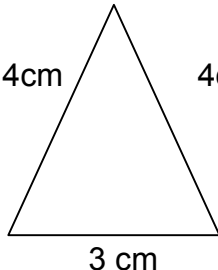
STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.17 TO ESTIMATE THE SIZE OF ANGLES.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to estimate the size of 30°, 45°, 60° and 90° angles. (N) If necessary, familiarize the students with 180°, 120°, 135° and 150° angles. It is important to relate what is being learned to familiar things such as the position of the hands on a clock or the intersection of two objects. The teacher should point out to the students that the hour hand on a clock moves along with the minute hand. For instance, at 9 o'clock, the hands form a right angle, but at 9:05 this is no longer true.	• Give the students the approximate measurement of angles in the classroom, then have them verify them with a protractor, a square or another measuring instrument. • Have the students measure the angles in a drawing or a photograph.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.18 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH PERIMETER.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize the symbols and vocabulary associated with the perimeter of a square: P = 4s: The perimeter of a square = $s + s + s + s$ or 4 times the length of one side. C² To be able to recognize the symbols and the vocabulary associated with the perimeter of a rectangle: P = (l + w) x 2: The perimeter of a rectangle = (length + width) multiplied by 2. C³ To be able to recognize the symbols and the vocabulary associated with the perimeter of a triangle: P = a + b + c: The perimeter of a triangle = side a + side b + side c.	- Have the students give situations in which they need to know the distance around something, that is, its perimeter. For example: - a window frame, to buy mouldings - a floor, to buy mouldings - a door frame, to buy a new door (width and height) - Ask the students the meaning of different symbols. - Have them find the symbol that corresponds to a given term. - Have them name parallel lines, perpendicular lines, lengths, widths, heights and so on.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.18 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH PERIMETER.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) To help the students understand perimeters and areas, it is important to deal with familiar objects. The students should understand that finding a perimeter is the same as finding the distance around a geometric figure. They must also differentiate between the features of a square and those of a rectangle and be able to use the vocabulary associated with perimeters: parallel, perpendicular, base, height, length, width and side.	

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.19 TO CALCULATE PERIMETERS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to calculate the perimeter of a square. C² To be able to calculate the perimeter of a rectangle. C³ To be able to calculate the perimeter of a triangle. (N) In the beginning, you can encourage the students to calculate without using formulas. Above all, they must clearly understand what a perimeter is and be able to measure it in their own way. Once they have acquired this knowledge, they can learn the appropriate formulas. When explaining the procedure, show each figure to the students to help them grasp the concept of perimeter.	- Do a lot of oral exercises. - Give the perimeter of a figure along with the measurements of its sides and ask the students to construct the procedure for finding the perimeter. Example A: 9 cm P = 36 cm Perimeter = 9 cm + 9 cm + 9 cm + 9 cm = 36 cm or P = 4s P = 4 x 9 cm P = 36 cm Where s = 9 cm

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.19 TO CALCULATE PERIMETERS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	Example B: 2 cm 4 cm P = 12 cm Perimeter = 4 cm + 2 cm + 4 cm + 2 cm = 12 cm or $P = (l + w) \times 2$ $P = (4 \text{ cm} + 2 \text{ cm}) \times 2$ $P = 6 \text{ cm} \times 2$ $P = 12 \text{ cm}$ Where $l = 4 \text{ cm}$ and $w = 2 \text{ cm}$

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.19 TO CALCULATE PERIMETERS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	Example C:  $P = 11 \text{ cm}$ Perimeter = $4 \text{ cm} + 4 \text{ cm} + 3 \text{ cm} = 11 \text{ cm}$ or $P = a + b + c$ Where $a = 4 \text{ cm}$, $b = 4 \text{ cm}$ and $c = 3 \text{ cm}$ $P = 4 \text{ cm} + 4 \text{ cm} + 3 \text{ cm}$ $P = 11 \text{ cm}$ • Have the students find the perimeter of different illustrated objects. • Have them find the perimeter of familiar objects.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.20 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH AREA.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize the symbols and vocabulary associated with the area of a square: A = s x s: area of a square = one side multiplied by another C² To be able to recognize the symbols and vocabulary associated with the area of a rectangle: A = l x w: area of a rectangle = length multiplied by width C³ To be able to recognize the symbols and vocabulary associated with the area of a triangle: A = b x h/2 : area of a triangle = base multiplied by height then divided by 2 C⁴ To be able to explain the meaning of m², cm² and mm².	- Working with a list of formulas accompanied by explanations (C¹, C² and C³), give the students a series of figures without measurements and have them choose which formula they would use to find the area of each figure. - Have the students explain their choice of formula or procedure. - Present the solution to a problem and have the students determine the given figure, measurements and question. For example: A = l x w l = 5 cm w = 2 cm A = 5 cm x 2 cm A = 10 cm² Answer: The figure is a rectangle; its length is 5 cm; its width is 2 cm; its area is 10 cm².

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.20 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH AREA.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) Knowing how to calculate area is essential when buying quantities. The students should be able to distinguish between perimeter and area. To fully grasp these concepts, the students should be able to do scale drawings. In addition, doing oral exercises using objects found in the classroom should help the students distinguish between perimeter and area. The students should see the difference between a centimetre and a square centimetre, as well as that between a metre and a square metre, in order not to answer by rote. As they learned to do with perimeters, the students should first calculate in their own way and then using the formulas that apply to squares and rectangles. For triangles, explain that a triangle is $\frac{1}{2}$ a rectangle then explain the formula to them.	

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.21 TO CALCULATE AREA.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to calculate the area of a square. C² To be able to calculate the area of a rectangle. C³ To be able to calculate the area of a triangle.	• See the activities proposed under Objective A 4.19 and adapt them to the concept of area. • Do drawings on the board and ask the students how to find the area of a square, a rectangle and a triangle. • Have the students calculate the area of various objects.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.22 TO ESTIMATE PERIMETERS AND AREAS.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to round measurements off in order to quickly find an approximate answer to questions about a perimeter or an area. For example: To install a storm window that measures 65 cm by 118 cm, you must: • round off the numbers, that is 65 cm and 118 cm = 70 cm and 120 cm • calculate the perimeter, that is $(70 + 120) \times 2 = (190) \times 2 = 380$ • round off the answer, that is $380 = 400$ cm, or close to 4 m	• Have the students find approximate quantities or sizes needed for various tasks. <i>For example:</i> - changing a window frame - replacing a window pane - installing a new door - replacing a carpet • Have the students find approximate areas and perimeters in figures on which the measurements are given. • Have them estimate the quantities and costs of materials needed to renovate a bedroom. <i>For example:</i> • installing a new carpet • changing the wallpaper • installing new mouldings for the windows and door • painting the walls and ceiling • installing shelves in the closet

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.23 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH CIRCLES.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES								
(N) Since students learn to calculate the circumference of a circle and the area of a disc in secondary school, the fourth step need only involve teaching them the vocabulary associated with the circle: radius, diameter and circumference. However, if the students need additional knowledge and are capable of understanding it, the teacher can direct them to secondary school or have them work individually. It should be remembered that this type of calculation is not often required in everyday situations. C¹ To be able to recognize the symbols and vocabulary associated with the circle. <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Term</u></th><th style="text-align: left; border-bottom: 1px solid black;"><u>Symbol</u></th></tr> </thead> <tbody> <tr> <td>radius</td><td><i>r</i></td></tr> <tr> <td>diameter</td><td><i>d</i></td></tr> <tr> <td>circumference</td><td><i>C</i></td></tr> </tbody> </table>	<u>Term</u>	<u>Symbol</u>	radius	<i>r</i>	diameter	<i>d</i>	circumference	<i>C</i>	• Working with drawings, have the students learn the meaning of “radius,” “diameter” and “circumference.” • Have the students think of situations in which they need to know something’s diameter. For example: - size of a table - size of a tablecloth - size of a bicycle wheel - size of a swimming pool - size of a flower pot - size of a fan • Have them think of situations in which they need to know something’s circumference. - buying lace to put around a tablecloth - buying lace to put around the bottom of a skirt
<u>Term</u>	<u>Symbol</u>								
radius	<i>r</i>								
diameter	<i>d</i>								
circumference	<i>C</i>								

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.23 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH CIRCLES.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
(N) The students should establish connections between these terms: • The circumference is the distance around a circle, that is, its perimeter. • The diameter is the straight line that goes through the centre of the circle and meets the circle at two points, dividing it into 2 equal parts. • The radius is the straight line that goes from the centre of the circle and joins the circumference at some point; it is equal to half the diameter.	• Have them look through flyers and brochures to find circular objects. For example: - fan: 52" in diameter - flower pot: 3", 5", 7"

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.24 TO MEASURE A DIAMETER. A 4.25 TO FIND A RADIUS. A 4.26 TO MEASURE A CIRCUMFERENCE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to measure a diameter. C² To be able to find a radius. C³ To be able to measure a circumference. (N) The radius, diameter and circumference of a circle are measurements of length. To measure the circumference, the students can begin by using a string, because it is flexible, then a tape measure. Measurements can be taken in centimetres and metres or inches and feet. In literacy training, the teacher should not take up the formulas for calculating the circumference of a circle or the area of a disc unless it is absolutely necessary.	- Propose measuring activities related to the students' environment and needs. - Have the students read data contained in drawings, catalogues and flyers.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.27 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH VOLUME.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to recognize the symbols and vocabulary associated with volume. Volume = v $v = l \times w \times h$ = length multiplied by width multiplied by height (N) The students should know such things as what volume is, which objects are measured by volume, when volume should be calculated and the connection between area and volume. C² To be able to explain the meaning of m^3 and cm^3. (N) Explain to the students the difference between m, m^2 and m^3 and between cm, cm^2 and cm^3.	- Have the students name objects that are measured by volume. <i>For example:</i> - a box - a swimming pool - cement steps - a sidewalk - Given several objects, have the students match each object with one of the following measurements: m, m^2, m^3, cm, cm^2, cm^3. <i>For example:</i> - The perimeter of a lot is 120 _____ . - The size of a rug to be purchased is 12 _____ . - A roll of wallpaper covers 20 _____ . - The amount of cement needed for the balcony is 15 _____ .

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.27 TO RECOGNIZE THE SYMBOLS AND VOCABULARY ASSOCIATED WITH VOLUME.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
	- The size of a regular stamp is 2 _____ . - The length of a trouser leg is 95 _____ . • Ask which unit of measurement should be used in the following situations: - replacing a window pane (m^2) - building a door frame (m) - making a sidewalk (m^3)

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.28 TO CALCULATE VOLUME.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to calculate volume. $v = l \times w \times h$ Volume = length x width x height (N) By working with everyday situations, the students will clearly understand the concept of volume and the way to calculate it.	• Have the students find the volume of objects from drawings that include measurements indicated on them. • Have them find the volume involved in the following situations: - making a cement sidewalk - constructing a balcony with cement steps - determining the number of boxes that can be loaded onto a truck

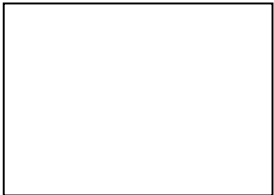
STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.29 TO ESTIMATE VOLUME.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to round measurements off in order to find an approximate answer. (N) To quickly find a volume, the students should round off the data. For example: How much cement is needed to construct a sidewalk that is 5.75 m long, 0.90 m wide and 0.15 m thick? $v = l \times w \times h$ $v = 5.75 \times 0.90 \times 0.15$ $v = 0.776 \text{ m}^3$ Estimating, the students will calculate: $v = 6 \text{ m} \times 1 \text{ m} \times 0.15 \text{ m}$ $v = 0.90 \text{ m}^3$ or 1 m^3 of cement	Have the students find everyday situations involving volume and then estimate that volume.

STEP 4

Knowledge should be acquired for the purpose of developing skills.

OBJECTIVE: A 4.30 TO RECOGNIZE THE SYMBOLS ASSOCIATED WITH SCALE DRAWINGS.

NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES					
C¹ To be able to recognize the symbols associated with scale drawings. map with a scale of 1 cm:1 m 0 10 20 30 40 km. or 1 : 1 000 000 <table><tr><td></td><td></td><td></td><td></td><td></td></tr></table> kilometres 1 cm = 10 km (reduced 1 000 000 times) (N) It is useful for the student to learn how to read road maps and do scale drawings. For instance, to be able to do a scale drawing of one's living room on graph paper enables one to visualize possible arrangements of furniture without actually moving anything around.						• Have the students find the scale used and what distance one centimetre represents on road maps and other types of maps. • Have the students find what scale is used and the nature of the real distances involved on geographical or topographical maps. • Have the students determine the scale used on a scale drawing.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.31 TO CALCULATE REAL DIMENSIONS OR DISTANCES FROM A SCALE DRAWING OR A ROAD MAP.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to find the real dimensions of objects from a scale drawing. C² To be able to find the actual distance between 2 points from a road map.	- Have the students find the real size of items in scale drawings. For example: Plan of a room 1 cm = 1 m 1:100  - measurements of the sides: length = 5 cm, width = 3.5 cm - actual dimensions: length = 5 x 100 = 500 cm or 0.5 m width = 3.5 x 100 = 350 cm or 0.35 m - Have the students find the actual distance between 2 points from a road map.

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.32 TO DO A SCALE DRAWING.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to do a scale drawing.	• Have the students do a scale drawing of the classroom. • Have them include the furniture in the scale drawing. • Have them draw up plans of such things as their living room or their house. • Have them make a road map that covers the distance between 2 points, identifying several towns or sites between them and indicating the scale used (e.g. the route between their home and the school).

STEP 4	
Knowledge should be acquired for the purpose of developing skills.	
OBJECTIVE: A 4.33 TO ESTIMATE SIZE AND DISTANCE.	
NOTES (N) AND CONTENT (C)	SUGGESTED ACTIVITIES
C¹ To be able to estimate the size of an object or the distance between 2 points given a scale.	• Have the students find the approximate distance between 2 cities from a road map. • Have them estimate the actual size of objects from scale drawings.

APPENDICES

Appendix 1

List of Arithmetic Objectives

LIST OF ARITHMETIC OBJECTIVES, STEP 1

OBJECTIVES	PREREQUISITES
A 1.01 To acquire certain basic concepts necessary for learning arithmetic: situating themselves in space.	P
A 1.02 To acquire certain basic concepts necessary for learning arithmetic: situating themselves in time.	P
A 1.03 To apply acquired knowledge to everyday objects or situations: situating themselves in space.	P
A 1.04 To apply acquired knowledge to everyday objects or situations: situating themselves in time.	P
A 1.05 To acquire certain basic concepts necessary for learning geometry: situating themselves in space.	P
A 1.06 To apply acquired knowledge to everyday objects or situations.	P
A 1.07 To recognize certain geometric shapes.	
A 1.08 To apply acquired knowledge to everyday objects or situations.	
A 1.09 To acquire certain basic concepts necessary for learning arithmetic (quantity).	P
A 1.10 To apply acquired knowledge to everyday objects or situations.	P
A 1.11 To recognize the symbols =, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, \$ and ¢.	P
A 1.12 To use symbols.	P
A 1.13 To count using numbers (1 to 99).	P
A 1.14 To form a two-digit number.	P

OBJECTIVES	PREREQUISITES
A 1.15 To break down a two-digit number.	P
A 1.16 To read a number less than 100.	P
A 1.17 To write a number less than 100.	P
A 1.18 To distinguish between odd and even numbers.	
A 1.19 To compare numbers under 100.	P
A 1.20 To rank numbers under 100.	P
A 1.21 To apply acquired knowledge (numbers from 1 to 100) to everyday situations.	P
A 1.22 To form a number of three or more digits.	P
A 1.23 To break down a number of three or more digits.	P
A 1.24 To read a number greater than 100.	P
A 1.25 To write a number greater than 100.	P
A 1.26 To compare numbers of three or more digits.	P
A 1.27 To rank numbers of three or more digits.	P
A 1.28 To apply acquired knowledge (numbers greater than 100) to everyday situations.	P
A 1.29 To distinguish between coins and bills.	P
A 1.30 To establish equivalences between different monetary values.	
A 1.31 To count sums of money.	P
A 1.32 To read sums of money.	P

OBJECTIVES	PREREQUISITES
A 1.33 To write sums of money.	P
A 1.34 To compare sums of money.	P
A 1.35 To rank sums of money.	P
A 1.36 To round off to the nearest dollar.	P
A 1.37 To apply acquired knowledge to everyday situations.	P
A 1.38 To write numbers as words.	P
A 1.39 To write cheques.	P
A 1.40 To read receipts.	P
A 1.41 To apply acquired knowledge to everyday situations.	
A 1.42 To recognize the plus sign.	
A 1.43 To recognize the minus sign.	
A 1.44 To use the vocabulary associated with addition.	
A 1.45 To use the vocabulary associated with subtraction.	
A 1.46 To become familiar with the calculator.	
A 1.47 To add and subtract using a calculator.	P
A 1.48 To apply a problem-solving approach (reasoning) to everyday situations, using a calculator (+, -).	P
A 1.49 To recognize the multiplication sign.	
A 1.50 To recognize the division sign.	

OBJECTIVES	PREREQUISITES
A 1.51 To use the vocabulary associated with multiplication.	
A 1.52 To use the vocabulary associated with division.	
A 1.53 To multiply and divide using a calculator.	P
A 1.54 To apply a problem-solving approach (reasoning) to everyday situations, using a calculator ($\times$, $\div$).	P

LIST OF ARITHMETIC OBJECTIVES, STEP 2

OBJECTIVES	PREREQUISITES
A 2.01 To acquire certain basic concepts necessary for learning fractions.	P
A 2.02 To apply acquired knowledge to everyday objects or situations.	P
A 2.03 To recognize the percent sign.	
A 2.04 To define "percentage."	
A 2.05 To use the vocabulary associated with percentage.	
A 2.06 To calculate percentages using a calculator.	
A 2.07 To apply a problem-solving approach (reasoning) to everyday situations, using a calculator.	
A 2.08 To recognize the symbol for degrees Celsius.	
A 2.09 To use instruments for measuring temperature.	
A 2.10 To read the temperature.	
A 2.11 To indicate key points on the temperature scale.	
A 2.12 To estimate the ambient temperature.	
A 2.13 To read and write metric units of time.	
A 2.14 To establish equivalences between different units of time.	
A 2.15 To add and subtract units of time in everyday situations.	
A 2.16 To be familiar with the symbols and vocabulary associated with metric units of length.	

OBJECTIVES	PREREQUISITES
A 2.17 To estimate length in metric units.	
A 2.18 To use instruments for measuring length.	
A 2.19 To be familiar with the symbols and vocabulary associated with metric units of liquid volume.	
A 2.20 To estimate quantity in metric units of liquid volume.	
A 2.21 To use instruments for measuring liquid volume.	
A 2.22 To be familiar with the symbols and vocabulary associated with metric units of weight.	
A 2.23 To estimate weight in metric units.	
A 2.24 To use instruments for measuring weight.	
A 2.25 To recognize the plus sign.	P
A 2.26 To recognize the minus sign.	P
A 2.27 To use the vocabulary associated with addition.	P
A 2.28 To use the vocabulary associated with subtraction.	P
A 2.29 To add numbers without carrying over.	P
A 2.30 To subtract numbers without borrowing.	P
A 2.31 To add numbers using carry-over.	P
A 2.32 To subtract numbers using borrowing.	P
A 2.33 To add sums of money.	P
A 2.34 To subtract sums of money.	P

OBJECTIVES	PREREQUISITES
A 2.35 To estimate the result of an addition.	
A 2.36 To estimate the result of a subtraction.	
A 2.37 To apply a problem-solving approach (reasoning) to everyday situations (+, -).	P
A 2.38 To become familiar with the calculator.	P
A 2.39 To use a calculator.	P
A 2.40 To check results obtained using a calculator.	P
A 2.41 To recognize the multiplication sign.	P
A 2.42 To recognize the division signs.	P
A 2.43 To use the vocabulary associated with multiplication.	P
A 2.44 To use the vocabulary associated with division.	P
A 2.45 To multiply by a one-digit multiplier.	P
A 2.46 To divide by a one-digit divisor.	P
A 2.47 To multiply by a multiplier with at least two digits.	P
A 2.48 To divide by a divisor with at least two digits.	P
A 2.49 To multiply sums of money.	P
A 2.50 To divide sums of money.	P
A 2.51 To multiply a number by 10, 100 and 1000 using mental calculation.	
A 2.52 To divide a number by 10, 100 and 1000 using mental calculation.	

OBJECTIVES	PREREQUISITES
A 2.53 To master the multiplication tables.	
A 2.54 To master the division tables.	
A 2.55 To estimate the result of a multiplication.	
A 2.56 To estimate the result of a division.	
A 2.57 To multiply and divide using a calculator.	P
A 2.58 To apply a problem-solving approach (reasoning) to everyday situations ($\times$, $\div$).	P

LIST OF ARITHMETIC OBJECTIVES, STEP 3

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 3.01 To recognize proper fractions in everyday situations.	P	✓
A 3.02 To recognize numerical representations of fractions.	P	
A 3.03 To recognize what a fraction is: perceiving a fraction as part of a whole.	P	✓
A 3.04 To recognize what a fraction is: perceiving a fraction as part of a group of similar objects.	P	✓
A 3.05 To read proper fractions.	P	✓
A 3.06 To write proper fractions.	P	✓
A 3.07 To compare different fractions.	P	✓
A 3.08 To use the vocabulary associated with proper fractions.		✓
A 3.09 To add fractions with the same denominator.	P	✓
A 3.10 To subtract fractions with the same denominator.	P	✓
A 3.11 To find a fraction that is equivalent to a given fraction.	P	✓
A 3.12 To simplify or reduce a fraction to its lowest terms.		✓
A 3.13 To recognize the equivalence between a mixed number and an improper fraction with the same denominator.	P	
A 3.14 To change a mixed number into an improper fraction.		

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 3.15 To change an improper fraction into a mixed number.		✓
A 3.16 To compare two fractions using a table of fractions.	P	✓
A 3.17 To add two fractions, one of whose denominators is a multiple of the denominator of the other.		✓
A 3.18 To add two fractions with prime denominators.		✓
A 3.19 To add a fraction and a mixed number or a whole natural number, or to add two mixed numbers.		✓
A 3.20 To subtract a fraction from a mixed number or subtract two mixed numbers without borrowing.		✓
A 3.21 To subtract a fraction or a mixed number from a mixed number with the same denominator by borrowing.		
A 3.22 To subtract two fractions, one of whose denominators is a multiple of the denominator of the other.		✓
A 3.23 To subtract two fractions with prime denominators.		✓
A 3.24 To subtract a fraction from a mixed number or a natural whole number, or to subtract one mixed number from another by borrowing.		
A 3.25 To multiply a whole number by a fraction.	P	✓
A 3.26 To multiply two fractions.		✓
A 3.27 To multiply a fraction by a mixed number.		

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 3.28 To divide a whole number by a fraction.		
A 3.29 To change a proper fraction into a decimal.	P	
A 3.30 To estimate the results of the four basic operations with the most common fractions.		
A 3.31 To apply a problem-solving approach (reasoning) to everyday situations involving proper fractions.		
A 3.32 To use the vocabulary associated with decimals.	P	
A 3.33 To read decimals.	P	✓
A 3.34 To write decimals.	P	✓
A 3.35 To compare decimals.	P	✓
A 3.36 To round off decimals to the nearest whole or half.	P	
A 3.37 To arrange decimals in order.	P	✓
A 3.38 To change a proper fraction into a decimal, using a calculator.	P	
A 3.39 To perform operations on decimals using a calculator.	P	
A 3.40 To estimate the results of operations on decimals using a calculator.		
A 3.41 To apply a problem-solving approach (reasoning) to everyday situations, using a calculator.	P	
A 3.42 To add decimals.		✓

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 3.43 To subtract decimals.		✓
A 3.44 To multiply decimals.		✓
A 3.45 To multiply a decimal by 10, 100 or 1000, using mental calculation.	P	✓
A 3.46 To divide decimals.		
A 3.47 To divide a decimal by 10, 100 or 1000, using mental calculation.	P	✓
A 3.48 To estimate the results of operations on decimals.		
A 3.49 To apply a problem-solving approach (reasoning) to everyday situations.		✓
A 3.50 To recognize the symbol for degrees Celsius.	P	
A 3.51 To use instruments for measuring temperature.	P	
A 3.52 To read and write the temperature.	P	✓
A 3.53 To indicate key points on the temperature scale.	P	
A 3.54 To estimate the ambient temperature.		
A 3.55 To read and write metric units of time.	P	✓
A 3.56 To establish equivalences between different units of time.	P	✓
A 3.57 To recognize the vocabulary associated with metric units of time.	P	✓
A 3.58 To add and subtract units of time in everyday situations.	P	
A 3.59 To multiply units of time in everyday situations.	P	

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 3.60 To divide units of time in everyday situations.	P	
A 3.61 To recognize the symbols and vocabulary associated with metric units of length.	P	
A 3.62 To determine the metric unit of length appropriate to a given item.	P	✓
A 3.63 To estimate different lengths.		✓
A 3.64 To use instruments for measuring length.	P	✓
A 3.65 To establish equivalences between different metric units of length.	P	✓
A 3.66 To perform the four basic operations (+, -, x, ÷) on metric units of length.	P	
A 3.67 To apply acquired knowledge to problems involving metric units of length in everyday situations.	P	✓
A 3.68 To recognize the symbols and vocabulary associated with metric units of liquid volume.	P	
A 3.69 To determine the metric unit of liquid volume appropriate to a given item.	P	
A 3.70 To estimate a quantity in metric units of liquid volume.		
A 3.71 To use instruments for measuring liquid volume.	P	
A 3.72 To establish equivalences between different metric units of liquid volume.	P	

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 3.73 To perform the four basic operations (+, -, x, ÷) on metric units of liquid volume.	P	
A 3.74 To apply acquired knowledge to problems involving metric units of liquid volume in everyday situations.	P	
A 3.75 To recognize the symbols and vocabulary associated with metric units of weight.	P	✓
A 3.76 To determine the metric unit of weight appropriate to a given item.	P	✓
A 3.77 To estimate weight in metric units.		✓
A 3.78 To use instruments for measuring weight.	P	
A 3.79 To establish equivalences between metric units of weight.	P	✓
A 3.80 To perform the four basic operations (+, -, x, ÷) on metric units of weight.	P	
A 3.81 To apply acquired knowledge to problems involving metric units of weight in everyday situations.	P	✓
A 3.82 To solve problems involving metric units, using a calculator.	P	

LIST OF ARITHMETIC OBJECTIVES, STEP 4

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 4.01 To recognize the percent sign.	P	
A 4.02 To define "percentage."	P	✓
A 4.03 To use the vocabulary associated with percentage.	P	
A 4.04 To calculate percentages.	P	✓
A 4.05 To estimate the result of an operation involving a percentage.		✓
A 4.06 To apply a problem-solving approach to everyday situations involving percentages.	P	✓
A 4.07 To be familiar with the rule of three.	P	
A 4.08 To know when and how to use the rule of three.	P	
A 4.09 To estimate the result of a problem solved using the rule of three.		
A 4.10 To apply a problem-solving approach using the rule of three in everyday situations.	P	
A 4.11 To recognize certain geometric figures.	P	✓
A 4.12 To measure straight lines.	P	✓
A 4.13 To recognize certain symbols and vocabulary associated with geometry.	P	✓
A 4.14 To use measuring instruments.	P	

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 4.15 To measure angles.	P	
A 4.16 To construct angles.	P	
A 4.17 To estimate the size of angles.		
A 4.18 To recognize the symbols and vocabulary associated with perimeter.	P	✓
A 4.19 To calculate perimeters.	P	✓
A 4.20 To recognize the symbols and vocabulary associated with area.	P	✓
A 4.21 To calculate area.	P	✓
A 4.22 To estimate perimeters and areas.		✓
A 4.23 To recognize the symbols and vocabulary associated with circles.		
A 4.24 To measure a diameter.		
A 4.25 To find a radius.		
A 4.26 To measure a circumference.		
A 4.27 To recognize the symbols and vocabulary associated with volume.	P	✓
A 4.28 To calculate volume.	P	✓
A 4.29 To estimate volume.		✓
A 4.30 To recognize the symbols associated with scale drawings.	P	

OBJECTIVES	PREREQUISITES	SEEN AT THE PRESECONDARY LEVEL
A 4.31 To calculate real dimensions or distances from a scale drawing or a road map.	P	
A 4.32 To do a scale drawing.	P	
A 4.33 To estimate size and distance.		

Appendix 2

Défi Mathématique
Manipulation
Exercises

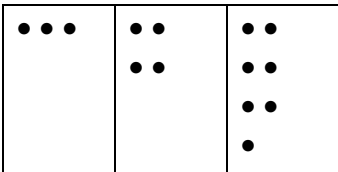
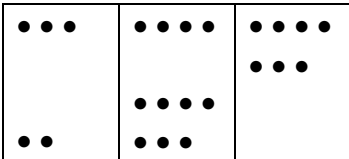
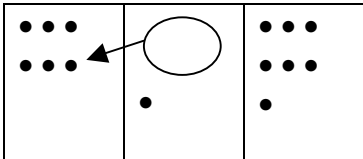
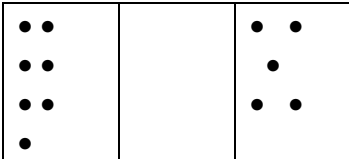
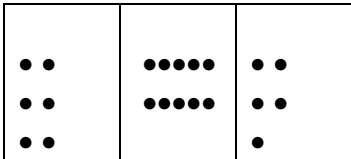
MANIPULATION EXERCISES

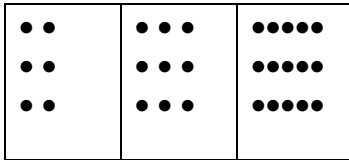
Numeration and the basic operations are based on the concept of number representation. To help students understand this concept, we have often suggested manipulation exercises, using either concrete objects or illustrations. The following pages contain a free translation of an extract of *Défi mathématique 4* (teaching and activity guide by Michel Lyons and Robert Lyons), which explains the suggested procedure. The authors of *Défi mathématique* favour the acquisition of concepts through discovery and experimentation in three steps:

- using concrete objects
- using illustrations
- using symbols

The tables represent illustrations, which serve as a transition between experimentation using concrete objects (manipulation) and experimentation using symbols (mathematical phrases). This is one way of helping students with difficulties learn the four operations.

The table below presents the four operations. Note that the right-hand column, "What to write," is only a translation of the manipulations performed. Do not try to use your own techniques. For now, it is important to see the relationships between the manipulations and their symbols.

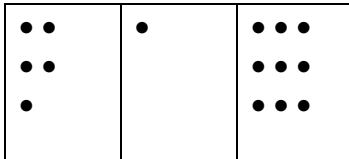
What to do	Comments	What to write
Addition: $347 + 270 = ?$		
	Represent the first number.	347
	Add the second number. There are enough tens to make another hundred.	$\begin{array}{r} 347 \\ + 270 \\ \hline 5117 \end{array}$
	No other exchange is necessary.	$\begin{array}{r} 347 \\ + 270 \\ \hline 5117 \\ 617 \end{array}$
Subtraction: $705 - 186 = ?$		
	This way of representing 705 does not allow for the subtraction of 8 tens and 6 units.	$\begin{array}{r} 705 \\ - 186 \\ \hline \end{array}$
	This way of representing 705 does not allow for the subtraction of 6 units.	$\begin{array}{r} 6105 \\ 705 \\ - 186 \\ \hline \end{array}$



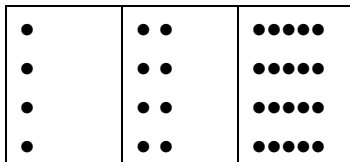
This way of representing 705 (6 hundreds + 9 tens + 15 units) now allows us to perform the operation directly from left to right.

$$\begin{array}{r} 69\mathbf{15} \\ 6\mathbf{10}5 \\ 705 \\ - 186 \\ \hline \end{array}$$

We get:

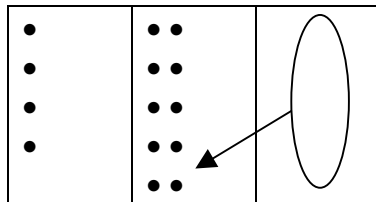


Multiplication: $4 \times 125 = ?$



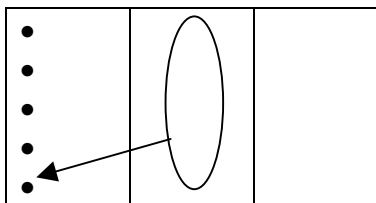
Represent the number 125 four times. There are enough units to make 2 more tens.

$$\begin{array}{r} 125 \\ \times 4 \\ \hline 48\mathbf{20} \end{array}$$



There are enough tens to make another hundred.

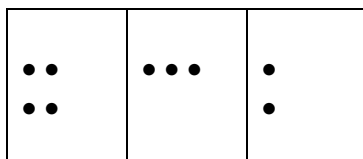
$$\begin{array}{r} 125 \\ \times 4 \\ \hline 48\mathbf{20} \\ 4\mathbf{100} \end{array}$$



No other exchange is necessary.

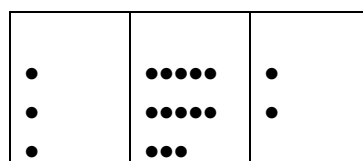
$$\begin{array}{r} 125 \\ \times 4 \\ \hline 48\mathbf{20} \\ 4\mathbf{100} \\ \hline 500 \end{array}$$

Division: $432 \div 3 = ?$

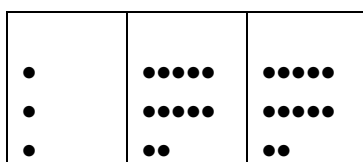


This way of representing 432 does not allow for the division of each digit by three.

$$\begin{array}{r} 432 \\ 3 \end{array}$$



Thirteen tens cannot be divided by 3 without a remainder.



The digit in each position is divisible by 3:
3 hundreds, 12 tens and
12 units equal 432.

Appendix 3

Model Problem- Solving Procedure

PROBLEM-SOLVING PROCEDURE

Problem solving is a complex objective. It is often the most difficult objective for students to attain. A variety of logic problems will help them acquire skills. In the bibliography, you will find reference material for problem solving. One of these references, *GVK 109 (Les quatre opérations)*, is intended for adults in literacy training and presents a four-step approach, a free translation of which appears on the following page.

WRITTEN PROBLEMS

The following is a four-step approach to help you solve written problems.

1. Detective 	a) Read the problem at least twice. b) Identify all the clues: ✓ Circle the important items. ✓ Cross out all useless information. ✓ Underline the question.
2. Architect 	a) Determine how to solve the problem. b) Plan the procedure in your head. c) Illustrate your problem with a drawing or a graph if possible.
3. Carpenter 	a) Write what you want to know. b) Write your solution. c) Do your calculations. d) Write your answer.
4. Referee 	a) Reread the problem and your solution. b) Did you answer the question correctly? c) If so, congratulate yourself (in your head). If not, begin again.

Appendix 4

Table of Fractions

TABLE OF FRACTIONS

1											
$\frac{1}{2}$											
$\frac{1}{3}$											
$\frac{1}{4}$											
$\frac{1}{5}$											
$\frac{1}{6}$											
$\frac{1}{7}$											
$\frac{1}{8}$											
$\frac{1}{9}$											
$\frac{1}{10}$											
$\frac{1}{11}$											
$\frac{1}{12}$											

Appendix 5

Decimals: Number Table

**DECIMALS:
Number Table**

Whole numbers

[illegible]

Appendix 6

Rules for Writing Metric Units and Their Symbols*

*Source: *The Canadian Style: A Guide to Writing and Editing*—Revised and Expanded. Toronto: Dundurn Press Limited, 1997

The Canadian Style

not

The Department of Public Works & Government Services
The Department of Indian Affairs & Northern Development

1.19 Monetary units

When it is necessary to distinguish dollar amounts in one currency from those in another, use the appropriate symbol with the figure in question:

The loan will be repaid in eighty instalments of C\$650
(or CAN\$650) each.

Please enclose a cheque in the amount of US\$100.

See 5.11 and 5.26 for further information on monetary units.

1.20 Months and days

Always spell out the names of the months in the body of your text and in footnotes. They may be abbreviated in tabular matter, citations and references, forms and sidenotes. *May*, however, should not be abbreviated and *June* and *July* are shortened only in military writing.

The names of the days of the week are not abbreviated, except in tables.

1.21 Time of day and elapsed time

Present exact time as follows:

11 a.m. or 11:00 a.m. 1 p.m. or 1:00 p.m.
3:30 p.m.

For elapsed time, use colons, periods and no spaces:

2:30:21.65 (hours, minutes, seconds, tenths, hundredths)

See 5.12 and 5.13 for additional information.

1.22 Time zones

Time zones are abbreviated when used with a specific time. Note that capitals are used, without periods. Otherwise they are written out in full:

4:30 p.m. EST 7:15 a.m. MST
Pacific standard time daylight saving time

1.23 The International System of Units (SI)

The International System of Units (SI), which has replaced other metric systems and is now used in Canada and many other countries, is a decimal-based system that includes units for physical quantities.

There are seven base units in SI:

Abbreviations

Table 1

Quantity	Unit name	Symbol
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

In addition, a number of derived units are used. Like the kelvin and the ampere, almost all of them are named after scientists associated with a scientific discovery. Thus, when the symbol is used, its initial letter is capitalized. When written in full, however, the unit name is in lower case, e.g. *H* for *henry* and *F* for *farad*.

Exception

Celsius takes an initial capital whether written in full or as a symbol.

The table below gives a complete list of derived units:

Table 2

Name	Symbol	Quantity
coulomb	C	quantity of electricity, electric charge
degree Celsius	°C	Celsius temperature*
farad	F	capacitance
gray	Gy	absorbed dose of ionizing radiation
henry	H	inductance
hertz	Hz	frequency
joule	J	energy, work, quantity of heat
lumen	lm	luminous flux
lux	lx	illuminance
newton	N	force
ohm	Ω	electric resistance
pascal	Pa	pressure, stress
radian	rad	plane angle
siemens	S	electric conductance
sievert	Sv	dose equivalent of ionizing radiation
steradian	sr	solid angle
tesla	T	magnetic flux density
volt	V	electric potential, potential difference, electromotive force
watt	W	power, radiant flux
weber	Wb	magnetic flux

* The Celsius temperature scale (previously called Centigrade, but renamed in 1948 to avoid confusion with "centigrad," associated with the centesimal system of angular measurement), is the commonly used scale, except for certain scientific and technological purposes where the thermodynamic temperature scale is preferred. Note the use of upper-case *C* for *Celsius*.

The Canadian Style

Multiples and submultiples of base units and derived units are expressed by adding one of the prefixes from the following table directly to the unit name:

Table 3

Factor	Prefix	Symbol	Factor	Prefix	Symbol
10^{24}	yotta	Y	10^{-1}	deci	d
10^{21}	zetta	Z	10^{-2}	centi	c
10^{18}	exa	E	10^{-3}	milli	m
10^{15}	peta	P	10^{-6}	micro	μ
10^{12}	tera	T	10^{-9}	nano	n
10^9	giga	G	10^{-12}	pico	p
10^6	mega	M	10^{-15}	femto	f
10^3	kilo	k	10^{-18}	atto	a
10^2	hecto	h	10^{-21}	zepto	z
10^1	deca	da	10^{-24}	yocto	y

- The prefix and unit names are always spelled as one word:

centimetre decagram
hectolitre kilopascal

- When symbols are used, the prefix symbol and unit symbols are run together:

5 cm 4 dag
7 hL 13 kPa

- When a symbol consists entirely of letters, leave a full space between the quantity and the symbol:

45 kg not 45kg

- When the symbol includes a non-letter character as well as a letter, leave no space:

32°C not 32° C or 32 °C

- For the sake of clarity, a hyphen may be inserted between a numeral and a symbol used adjectivally (see also 2.10):

35-mm film 60-W bulb

- Unit symbols and prefixes should always be in lower case, even when the rest of the text is in upper case:

SIBERIA DRIFTS 5 cm CLOSER TO ALASKA

Exceptions

The symbol *L* for *litre* (to distinguish it from the numeral *l*) and, as mentioned above, those symbols derived from the names of scientists.

- SI usage prescribes that both numerals and unit names be written in full or that both be abbreviated:

two metres or 2 m

Abbreviations

Current usage, however, accepts the use of numerals with spelled-out unit names to facilitate comprehension:

He ran the 100 metres in 10 seconds.

In scientific and technical writing, the preferred form is numerals with unit symbols:

The specific latent heat of fusion of sulphur is 38.1 K/kg.

When no specific figure is stated, write the unit name in full:

The means of transportation chosen depends on how many kilometres an employee has to travel to work.

- Area and volume in the metric system are expressed by means of superscript numerals:

5 cm³ 20 m²

Do not use abbreviations such as *cc* or *cu. cm* for *cubic centimetre* (cm³), *kilo* for *kilogram* (kg), *amp* for *ampere* (A) or *kph* for *kilometres per hour* (km/h).

Because of their practical importance, the following additional units are approved for use with SI, although they do not, strictly speaking, form part of it:

Table 4

Quantity	Unit name	Symbol
time	minute	min
	hour	h
	day	d
	year	a
	degree	°
plane angle	minute	'
	second	"
	revolution	r
	hectare	ha
area	hectare	ha
volume	litre	L
mass	metric ton, tonne	t
linear density	tex	tex

Note that there is no standard symbol for *week* or *month*. These units should therefore always be spelled out in technical writing.

When a unit symbol is combined with a symbol for time, or with a derived unit implying a division, an oblique (/) separates the two:

80 km/h not 80 kmh or 80 kph
1800 r/min not 1800 rpm
50 A/m not 50 Am
200 J/kg not 200 Jkg

Bibliography

Caron, Jacqueline, and Ernestine Lepage. *Vers un apprentissage authentique de la mathématique*. Édition NHP.
Collection "Outils pour une pédagogie ouverte." Cahier 10.

Lyons, Robert, and Michel Lyons. *Défi mathématique 4*. Laval: Édition Mondia.

_____. *S.O.S. Math, Le calcul sur les nombres entiers*. Laval: Éditions Mondia, 1990.

Programme d'études mathématiques. Ordre d'enseignement: présecondaire, éducation des adultes. Document de travail.
Version 3. May 1994.

Québec. Ministère de l'Éducation. Direction générale du développement pédagogique. *Curriculum Guide, Elementary School, Mathematics, General Guide, Booklet A*. Code 16-2300-01A. Québec, 1984.

_____. *Curriculum Guide, Elementary School, Mathematics, Unifying Concepts, Booklet B*. Code 16-2300-02A.
Québec, 1984.

_____. *Curriculum Guide, Elementary School, Mathematics, Natural Numbers, Booklet C*. Code 16-2300-03A.
Québec, 1985.

_____. *Curriculum Guide, Elementary School, Mathematics, Relative Integers, Booklet D*. Code 16-2300-04A.
Québec, 1986.

_____. *Curriculum Guide, Elementary School, Mathematics, Fractions, Booklet E*. Code 16-2300-05A. Québec,
1986.

_____. *Curriculum Guide, Elementary School, Mathematics, Geometric Activities, Booklet F*. Code 16-2300-06A.
Québec, 1986.

_____. *Curriculum Guide, Elementary School, Mathematics, Measurement, Booklet G*. Code 16-2300-07A.
Québec, 1985.

_____. *Curriculum Guide, Elementary School, Mathematics, The Use of Calculators, Booklet H*.
Code 16-2300-08A. Québec, 1984.

_____. *Curriculum Guide, Elementary School, Mathematics, Problem Solving, General Orientations, Booklet K*.
Code 16-2300-11A. Québec, 1989.

_____. *Curriculum Guide, Elementary School, Mathematics, Planning Learning Situations, General Framework, Booklet L*. Code 16-2300-12A. Québec, 1989.

_____. *Elementary School Curriculum, Mathematics*. Code 16-2300-00A. Québec, 1995.

Services éducatifs des adultes de la Commission scolaire catholique de Sherbrooke. *GVK 109, Les quatre opérations* (+, -, $\times$, $\div$). Sherbrooke.

The Canadian Style: A Guide to Writing and Editing—Revised and Expanded. Toronto: Dundurn Press Limited, 1997.

